Australian Government

MSA07 Manufacturing Training Package

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MSARVS301A Develop and update caravan industry knowledge 1049
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MSATCM301A Test the mechanical properties of materials 1069
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MSATCM303A Monitor non-ferrous melting and casting processes 1084
MSATCM304A Interpret basic binary phase diagrams 1093
MSATCM305A Demonstrate basic knowledge of casting operations 1098
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MSATCM402A Monitor and test sands, cores and moulds 1110
MSATCM403A Evaluate mould design and gating 1116
MSATCM404A Undertake and interpret results of chemical analysis on metal samples 1122
MSATCM405A Determine and supervise heat treatment of metal 1130
MSATCM406A Apply basic chemical principles to metallurgy 1138
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MSATCM505A Select metal joining process 1170
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MSATCM511A Apply metallurgy principles and practice to determine metal forming and shaping processes 1212
MSATCM512A Apply metallurgy principles and practice to optimise furnace operation 1219
MSATCM513A Plan and complete metallurgical projects 1225
MSATCM514A Select surface treatment methods for metallic components or products 1234
MSATCM515A Analyse metallurgical failures of components and recommend preventative measures 1241
MSATCM516A Select non metallic materials for engineering applications 1248
MSATCM517A Determine corrosion prevention strategies for metal and alloys 1256
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MSATMVER302A Verify a simple measuring instrument 1423
MSATMVER401A Verify a limited weighing instrument 1434
MSATMVER402A Verify a liquid measuring instrument using volume measures 1446

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MSATMVER403A Verify inspector's class reference standards 1458
MSATMVER501A Verify a complex measuring instrument 1469
AUM4003A Interpret customer requirements 1483
AURAAA4002 Determine retail rates for work 1485
AURACA2001 Establish relations with customers 1490
AURACA3002 Establish customer requirements of a complex nature 1496
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AURAFA2004 Solve routine problems in an automotive workplace 1508
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AURALA3001 Determine legal aspects of an automotive service and repair contract 1527
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AURAMA4005 Manage complex customer issues 1539
AURAMA5006 Contribute to business improvement 1546
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AURATA3005 Estimate complex jobs 1559
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AURC341903A Apply relevant finance, leasing and insurance contracts/policies 1574
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AURETR2012 Test and repair basic electrical circuits 1590
AURETR2015 Inspect and service batteries 1600
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AURTTA3017 Carry out vehicle safety and roadworthy inspections 1676
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AURTTD2004 Inspect and service suspension systems 1693
AURTTJ2002 Remove and refit wheel hubs and associated brake components 1702
AURTTY3001 Repair chassis, frame and associated components 1711
AURV365356A Read and interpret vehicle body repair estimation/quotation 1720
AURVTG3011 Install side windows 1728
AURVTN2005 Remove and fit protector mouldings, transfers and decals 1737
AURVTN4032 Determine vehicle damage and recommended repair procedures 1746
AURVTP2007 Apply paint touch-up techniques 1754
AURVTS3004 Repair fibreglass and composite material components 1763
AURVTT3015 Fabricate canvas products 1772
AURVTT3016 Fabricate frame structures 1781
AURVTT3019 Fabricate and install canopies and curtains 1790
BSBCUS501C Manage quality customer service 1798
BSBFIM501A Manage budgets and financial plans 1804
BSBINM501A Manage an information or knowledge management system 1812
BSBMGT403A Implement continuous improvement 1819
BSBMGT502B Manage people performance 1825
BSBWRK510A Manage employee relations 1832
FDFOP2005A Work in a socially diverse environment 1838
FNSORG501A Develop and manage a budget 1844

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LMTCL2001B Use a sewing machine 1850
LMTCL2003B Identify fibres and fabrics 1856
LMTCL2006B Press work 1862
LMTCL2007B Lay up, mark and cut uncomplicated fabrics and lays 1868
LMTCL2008B Finish garment production 1875
LMTGN2008B Coordinate work of team or section 1880
LMTGN4002A Participate in product engineering 1886
LMTGN4016A Contribute to the development of products or processes 1892
LMTGN5004A Manage installation and commissioning of equipment and systems 1898
MEM03001B Perform manual production assembly 1904
MEM03003B Perform sheet and plate assembly 1910
MEM03004B Perform electronic/electrical assembly (production) 1916
MEM03006B Set assembly stations 1922
MEM05005B Carry out mechanical cutting 1928
MEM05007C Perform manual heating and thermal cutting 1934
MEM05012C Perform routine manual metal arc welding 1940
MEM05050B Perform routine gas metal arc welding 1945
MEM05051A Select welding processes 1951
MEM05052A Apply safe welding practices 1957
MEM06003C Carry out heat treatment 1966
MEM07001B Perform operational maintenance of machines/equipment 1972
MEM07015B Set computer controlled machines/processes 1978
MEM07024B Operate and monitor machine/process 1985
MEM07028B Operate computer controlled machines/processes 1991
MEM08002C Pre-treat work for subsequent surface coating 1998
MEM08007B Control surface finish production and finished product quality 2004
MEM08011B Prepare surfaces using solvents and/or mechanical means 2010
MEM08012B Prepare surfaces by abrasive blasting (basic) 2017
MEM08013B Prepare surfaces by abrasive blasting (advanced) 2024
MEM08014B Apply protective coatings (basic) 2030
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MEM08016B Control blast coating by-products, materials and emissions 2048
MEM09002B Interpret technical drawing 2054
MEM09005B Perform basic engineering detail drafting 2060
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MEM09009C Create 2D drawings using computer aided design system 2072
MEM09011B Apply basic engineering design concepts 2079
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MEM11002C Erect/dismantle complex scaffolding and equipment 2162
MEM11003B Coordinate erection/dismantling of complex scaffolding/equipment 2170
MEM11004B Undertake dogging 2178
MEM11005B Pick and process order 2185
MEM11006B Perform production packaging 2191
MEM11007B Administer inventory procedures 2196

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MEM11010B Operate mobile load shifting equipment 2201
MEM11011B Undertake manual handling 2208
MEM11012B Purchase materials 2213
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MEM11017B Organise and lead stocktakes 2224
MEM11021B Perform advanced operation of load shifting equipment 2229
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MEM12001B Use comparison and basic measuring devices 2241
MEM12002B Perform electrical/electronic measurement 2246
MEM12003B Perform precision mechanical measurement 2252
MEM12005B Calibrate measuring equipment 2258
MEM12006C Mark off/out (general engineering) 2264
MEM12022B Program coordinate measuring machines (advanced) 2271
MEM12023A Perform engineering measurements 2278
MEM12024A Perform computations 2284
MEM12025A Use graphical techniques and perform simple statistical computations 2291
MEM13001B Perform emergency first aid 2297
MEM13002B Undertake occupational health and safety activities in the workplace 2302
MEM13003B Work safely with industrial chemicals and materials 2308
MEM13004B Work safely with molten metals/glass 2314
MEM13010A Supervise occupational health and safety in an industrial work environment. 2320
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MSS404050A Undertake process capability improvements 3720
MSS404052A Apply statistics to operational processes 3727
MSS404060A Facilitate the use of planning software systems in a work area or team 3735
MSS404061A Facilitate the use of SCADA systems in a team or work area 3742
MSS404081A Undertake proactive maintenance analyses 3749
MSS404082A Assist in implementing a proactive maintenance strategy 3757
MSS404083A Support proactive maintenance 3765
MSS405001A Develop competitive systems and practices for an organisation 3773
MSS405002A Analyse and map a value stream 3781
MSS405003A Manage a value stream 3789
MSS405004A Develop business plans in an organisation implementing competitive systems and practices 3796
MSS405005A Manage competitive systems and practices responding to individual and unique customer orders 3804
MSS405010A Manage relationships with non-customer external organisations 3813
MSS405011A Manage people relationships 3820
MSS405012A Manage workplace learning 3827
MSS405020A Develop quick changeover procedures 3835
MSS405021A Develop a Just in Time system 3843
MSS405022A Design a process layout 3852
MSS405023A Develop a levelled pull system for operations and processes 3860
MSS405030A Optimise cost of a product or service 3868
MSS405031A Undertake value analysis of product or process costs in terms of customer requirements 3875
MSS405032A Analyse cost implications of maintenance strategy 3882
MSS405040A Manage 5S system in an organisation 3890
MSS405041A Implement improvement systems in an organisation 3898
MSS405050A Determine and improve process capability 3907
MSS405052A Design an experiment 3914
MSS405053A Manage application of six sigma for process control and improvement 3923
MSS405060A Develop the application of enterprise control systems in an organisation 3931
MSS405061A Determine and establish information collection requirements and processes 3939
MSS405070A Develop and manage sustainable energy practices 3946
MSS405075A Facilitate the development of a new product 3954
MSS405081A Develop a proactive maintenance strategy 3963
MSS405082A Adapt a proactive maintenance strategy to the process operations sector 3971
MSS405083A Adapt a proactive maintenance strategy for a seasonal or cyclical business 3980
PMAOHS310B Investigate incidents 3989
PMAOHS420B Develop First Aid procedures and manage resources 3998
PMAOMIR407B Audit incident preparedness and established response systems 4004
PMAOMIR418B Coordinate incident response 4011
PMAOMIR424B Develop and maintain community relationships 4019
PMAOMIR430B Conduct and assess incident exercises 4026

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PMAOMIR444B Develop incident containment tactics 4033
PMAOMIR449B Monitor legal compliance obligations during incidents 4040
PMAOPS101C Read dials and indicators 4047
PMAOPS280B Interpret process plant schematics 4053
PMAOPS350B Match and adjust colour 4061
PMAOPS402A Respond to abnormal process situations 4068
PMAOPS405B Operate complex control systems 4074
PMAOPS410B Monitor remote production facilities 4084
PMAOPS411B Manage plant shutdown and restart 4092
PMAOPS450B Solve colour problems 4099
PMAOPS500A Optimise production systems 4105
PMAOPS550B Develop a colour formulation 4111
PMAOPS600C Modify plant 4118
PMASUP410B Develop plant documentation 4126
PMASUP420B Minimise environmental impact of process 4133
PMASUP432B Coordinate pipeline projects 4140
PMASUP440B Commission/recommission plant 4148
PMASUP441C Decommission plant 4157
PMASUP445A Participate in HAZOP studies 4164
PMASUP520B Review procedures to minimise environmental impact of process 4172
PMASUP540B Analyse equipment performance 4180
PMBFIN201C Finish products and components 4186
PMBFIN205C Hand decorate products 4193
PMBHAN103C Shift materials safely by hand 4199
PMBPREP205C Assemble materials and equipment for production 4204
PMBPREP206C Prepare materials to formulae 4211
PMBPREP301C Set up and prepare for production 4217
PMBPREP303C Set up equipment for continuous operation 4224
PMBPREP304C Set a die 4232
PMBPREP305B Change extrusion die and setup 4240
PMBPROD221B Operate rotational moulding equipment 4246
PMBPROD235C Use materials and process knowledge to complete work operations 4253
PMBPROD236C Operate hand held air/power equipment for production processes 4260
PMBPROD240C Cut materials 4267
PMBPROD241C Lay up rubber lining or lag pulleys 4273
PMBPROD242A Bond polymers to surfaces 4281
PMBPROD247C Hand lay up composites 4289
PMBPROD248C Prepare surfaces for coating 4296
PMBPROD265C Operate portable vulcanising equipment 4302
PMBPROD321B Produce rotational moulded products 4310
PMBPROD323C Produce powder coated products 4318
PMBPROD347B Produce composites using hand lamination 4326
PMBPROD375B Vulcanise products using an autoclave 4333
PMBPROD380B Produce composites using chopper gun/depositor 4341
PMBPROD430B Trial a new die/tool 4349
PMBPROD431B Trial a new, advanced or complex mould 4356
PMBTECH301B Use material and process knowledge to solve problems 4362
PMBTECH302A Modify existing compounds 4368
PMBTECH303A Make minor modifications to products 4374
PMBTECH401B Predict polymer properties and characteristics 4380
PMBTECH402B Set advanced or complex dies 4385
PMBTECH403B Test fibre-composites materials and laminates 4393
PMBTECH404B Mould chemical resistant and/or fire retardant fibre-composites 4399

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PMBTECH405B Repair damaged fibre-composites structures 4406
PMBTECH406A Diagnose production equipment problems 4412
PMBTECH501B Analyse equipment performance 4419
PMBTECH502B Review and analyse production trials and specify retrials 4425
PMBTECH503B Determine rheology and output of plastics materials from processing equipment 4431
PMBTECH504B Determine heat transfer loads for processing equipment 4436
PMBTECH505B Choose polymer materials for an application 4441
PMBTECH506B Analyse the design of products and tools 4446
PMBTECH507B Develop fibre composite products using cored-laminate techniques 4451
PMBTECH508A Develop a new compound 4458
PMBTECH509A Modify an existing product 4465
PMBTECH510A Analyse failure in polymeric materials 4471
PMBTECH601B Develop a new product 4477
PMBTECH602B Develop a new die or tool 4485
PMBTECH603B Design structural/mechanical polymer components 4491
PMC554020D Design and prepare models, moulds and dies 4497
PMC554090B Undertake simple refractory design 4504
PMC554091B Analyse refractory failures 4510
PSPGOV408A Value diversity 4516
PSPPM402B Manage simple projects 4525
PSPPM501B Design complex projects 4534
PSPPM502B Manage complex projects 4546
PSPPM503B Close complex projects 4556
RIIOHS204A Work safely at heights 4564
RIIRIS201B Conduct local risk control 4571
SIRXCCS201 Apply point-of-sale handling procedures 4578
SIRXINV004A Buy merchandise 4585
SIRXMER303 Coordinate merchandise presentation 4596
SIRXMER004A Manage merchandise and store presentation 4602
SIRXRSK001A Minimise theft 4609
SIRXRSK002A Maintain store security 4616
SIRXSLS002A Advise on products and services 4622
SITXMGT501 Establish and conduct business relationships 4628
SITXMPR401 Coordinate production of brochures and marketing materials 4634
SITXMPR402 Create a promotional display or stand 4640
SITXMPR404 Coordinate marketing activities 4646
TAEASS401B Plan assessment activities and processes 4652
TAEASS402B Assess competence 4659
TAEASS403B Participate in assessment validation 4667
TAEDEL301A Provide work skill instruction 4672
TLIA5058A Manage facility and inventory requirements 4680
TLID2010A Operate a forklift 4687
TLIL4059A Implement asset management systems 4695
TLIL5055A Manage a supply chain 4701
TLIP4013A Implement and monitor logistics planning and process 4707
TLIR4003A Negotiate a contract 4713
TLIR4008A Implement and supervise stocktaking procedures 4720
TLIR4009A Implement purchasing systems 4725
TLIR4010A Plan purchasing 4731
TLIR5005A Manage a contract 4738
TLIR5006A Develop, implement and review purchasing strategies 4744
TLIX5015A Establish supply chains 4752

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UEGNSG604B Fill gas cylinders 4758
UEPMNT420A Perform Electrical/Electronic Drafting 4776

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Modification History

Version	Release Date	Comments

8.3	9 February 2014	**ISC Upgrades**
		• 2 units updated to comply with new Australian Standard:
		  • MSAPMWJ201A Use high pressure water jetting equipment
		  • MSAPMWJ301A Operate a high pressure water jetting system
		• 14 qualifications updated to reflect imported units replaced by new releases.
		• Miscellaneous corrections
		Refer to MSA07v8.3 Summary Mapping for details.

8.2	5 April 2013	**ISC Upgrades** • Seven (7) competitive manufacturing qualifications not carried forward - superseded by new qualifications endorsed 20 April 2012 in MSS11v2 • Competitive manufacturing units of competency not carried forward - superseded by new units endorsed in MSS11v2 • New release of fifteen (15) qualifications - imported elective units updated to current versions (including prerequisites) • Editorial changes to six (6) units of competency • Editorial changes to two (2) licensing Skill Sets • Unit grid updated for one (1) Skill Set Refer to mapping for details.
8.1	15 October 2012	**ISC upgrade** Editorial changes to boiler units of competency to clarify WHS Regulations.
8	15 May 2012	**Endorsed changes** Addition of two new units: • MSABLIC001 License to operate a standard boiler

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Version	Release Date	Comments
		• MSABLIC002 License to operate and advanced boiler **ISC upgrades** • Inclusion of two boiler licensing Skill Sets • Inclusion of 59 units imported from MSS11v2 • Competitive Manufacturing qualifications superseded by new Competitive Systems and Practices (endorsed in MSS11v2). • Competitive Manufacturing units of competency in other MSA qualifications replaced by Competitive Systems and Practices units imported from MSS11v2. Refer to mapping for more details.
7	15 November 2011	Addition of two new qualifications: • MSA40311 Certificate IV in Process Manufacturing • MSA50311 Diploma of Production Management Inclusion of 51 additional imported units. (Refer to mapping for details.) ISC upgrades include: • Addition of a Leading Hand/Supervisor Skill Set • Updating of imported units • Minor editorial changes • Imported units updated in relevant qualifications.
6	April 2011	**Endorsed changes** Addition of eight new qualifications and six new units of competency for recreational vehicle manufacture, retailing, service and repair. Inclusion of an additional 82 imported units as

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Version	Release Date	Comments
		electives for recreational vehicle qualifications. Two new units of competency for water jetting included as electives in MSA30309. One new unit of competency to replace a deleted imported unit. **ISC upgrades** 11 qualifications adjusted for flexibility/sustainability requirements (refer to mapping for details) Minor edits to 5 MSAPM units (MSAPMOHS100A, OHS200A, OPS101A, OPS363A and SUP106A) Imported units updated and minor typographical errors corrected in mapping. ***Refer to Summary Mapping for details of changes to qualifications and units.***
5.1	July 2010	**ISC Updates**: Eight qualifications adjusted to comply with flexibility rules: MSA10107, MSA10207, MSA20107, MSA21108, MSA30107, MSA30309, MSA31108, MSA41108. Confined Space Entry units updated to comply with revised Australian Standard AS2685-2009: MSAPMPER200C, MSAPMPER205C and MSAPMPER300C. Sustainability units (MSAENV272B,

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Version	Release Date	Comments
		MSAENV472B and MSAENV672B) updated to clarify terminology and to expand Range of Variables to better incorporate environmental sustainability. PML04 units of competency updated to MSL09 units in MSA30208, MSA40108, MSA50108 and MSA60108.
5	November 2009	• One new qualification - MSA30309 Certificate III in Surface Preparation and Coating Application. • Three new units of competency and an additional 35 imported units for inclusion in MSA07 aligned to the new certificate. • Fourteen (14) new units of competency and five Skill Sets for Trade Measurement (not aligned to any qualifications). **Refer to History for details.** In addition, minor corrections have been made to the Overview of Assessment Requirements in the Evidence Guide for two sustainability units (MSAENV272A and MSAENV472A).
4	27 July 2009	MSA07v4 includes two new qualifications: MSA71109 Vocational Graduate Certificate in Competitive Manufacturing MSA81109 Vocational Graduate Diploma of Competitive Manufacturing. It also includes 21 new units of competency.
3.1	12 March 2009	Version 3.1 includes six new units and the importation of an additional 10 MEM units for a new structural steel detailing stream in the following existing qualifications: • MSA30208 Certificate III in Manufacturing

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Version	Release Date	Comments
		Technology • MSA50108 Diploma of Manufacturing Technology. Miscellaneous typographical errors have been corrected. Refer to Modification History for details.
3	27 August 2008	MCM04 qualifications and units of competency recoded and placed in MSA07. Key Competencies replaced in Competitive Manufacturing units with Employability Skills. Two new specialist streams for metallurgy and polymer technology have been added to the existing Technology Cadetship qualifications, now coded MSA30208 and MSA40108. Two new Technology Cadetship qualifications – MSA50108 and MSA60108. Category 1 changes to following MSAPM units resulting from review of PMA08: MSAPMPER200B, MSAPMPER205B, MSAPMPER300B and MSAPMOHS210B. Two additional MSAPM units: MSAPMPER202A and MSAPMPER400A Deletion of MSAPM302A Category 1 changes to MSA10107, MSA10207, MSA20107 and MSA30107 as a result of recoding of MCM units and changes to MSAPM units. Additional Category 1 changes to MSA10107 to include updated versions of LMT and LMF units.

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Version	Release Date	Comments
2	16 November 2007	Addition of three production support certificates and other generic units for use across the three process manufacturing Training Packages (PMA, PMB and PMC). This included the three new sustainability units. Units of competency in MSA10107 Certificate I in Manufacturing (Pathways) updated with units from PMB07 (details below).
1	April 2007	Initial release

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Check the version number before commencing training or assessment

This Training Package is Version 8.3 - check whether this is the latest version by going to the training.gov.au website and locating information about the Training Package. Alternatively, contact Manufacturing Industry Skills Council at http://www.mskills.com.au to confirm the latest version number.

Explanation of version number conventions

The primary release Training Package is Version 1. When changes are made to a Training Package, sometimes the version number is changed and sometimes it is not, depending on the extent of the change. When a Training Package is reviewed it is considered to be a new Training Package for the purposes of version control, and is Version 1. Do not confuse the version number with the Training Packages national code (which remains the same during its period of endorsement).

Explanation of the review date

The review date shown on the title page indicates when the Training Package is expected to be reviewed in the light of changes, such as changing technologies and circumstances. The review date is not an expiry date. Training Packages and their components remain current until they are reviewed or replaced.

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List of AQF Qualifications MSA07v8.3

Qualification Code	Title
MSA10107	Certificate I in Manufacturing (Pathways)
MSA10207	Certificate I in Process Manufacturing
MSA20107	Certificate II in Process Manufacturing
MSA20208	Certificate II in Manufacturing Technology
MSA20510	Certificate II in Recreational Vehicle Service and Repair
MSA20610	Certificate II in Recreational Vehicle Manufacture
MSA30107	Certificate III in Process Manufacturing
MSA30208	Certificate III in Manufacturing Technology

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Qualification Code	Title
MSA30309	Certificate III in Surface Preparation and Coating Application
MSA30510	Certificate III in Recreational Vehicle Service and Repair
MSA30610	Certificate III in Recreational Vehicle Manufacture
MSA30710	Certificate III in Recreational Vehicle and Accessories Retailing
MSA40108	Certificate IV in Manufacturing Technology
MSA40311	Certificate IV in Process Manufacturing
MSA40510	Certificate IV in Recreational Vehicles
MSA40710	Certificate IV in Recreational Vehicle and Accessories Retailing
MSA50108	Diploma of Manufacturing Technology
MSA50311	Diploma of Production Management
MSA50510	Diploma of Recreational Vehicles
MSA60108	Advanced Diploma of Manufacturing Technology

Competitive manufacturing qualifications superseded by MSS11 qualifications

MSA07 Code	MSA07 Title	MSS11v2 Code	MSS11v2 Title
MSA21108	Certificate II in Competitive Manufacturing	MSS20312	Certificate II in Competitive Systems and Practices
MSA31108	Certificate III in Competitive Manufacturing	MSS30312	Certificate III in Competitive Systems and Practices
MSA41108	Certificate IV in Competitive Manufacturing	MSS40312	Certificate IV in Competitive Systems and Practices
MSA51108	Diploma of Competitive Manufacturing	MSS50312	Diploma of Competitive Systems and Practices
MSA61108	Advanced Diploma of Competitive Manufacturing	MSS60312	Advanced Diploma of Competitive Systems and Practices

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MSA71109	Vocational Graduate Certificate in Competitive Manufacturing	MSS70312	Vocational Graduate Certificate in Competitive Systems and Practices
MSA81109	Vocational Graduate Diploma of Competitive Manufacturing	MSS80312	Vocational Graduate Diploma of Competitive Systems and Practices

Units of competency and their prerequisites MSA07v8.3

Code	Title	Prerequisite
MSABLIC001	Licence to operate a standard boiler	None
MSABLIC002	Licence to operate an advanced boiler	None
MSAENV272B	Participate in environmentally sustainable work practices	None
MSAENV472B	Implement and monitor environmentally sustainable work practices	None
MSAENV672B	Develop workplace policy and procedures for environmental sustainability	None
MSAPCI101A	Adapt to work requirements in industry	None
MSAPCI102A	Apply effective work practices	None
MSAPCI103A	Demonstrate care and apply safe practices at work	None
MSAPCII295A	Operate manufacturing equipment	None
MSAPCII296A	Make a small furniture item from timber	None
MSAPCII297A	Make an object from cloth using an existing pattern	None
MSAPCII298A	Make an object from metal	None
MSAPCII299A	Make an object from plastic	None
MSAPMOHS100A	Follow OHS procedures	None
MSAPMOHS110A	Follow emergency response procedures	None

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MSAPMOHS200A	Work safely	None
MSAPMOHS205A	Control minor incidents	None
MSAPMOHS210B	Undertake first response to non-fire incidents	None
MSAPMOHS212A	Undertake first response to fire incidents	None
MSAPMOHS216A	Operate breathing apparatus	None
MSAPMOHS217A	Gas test atmospheres	None
MSAPMOHS220A	Provide initial first aid response	None
MSAPMOHS300A	Facilitate the implementation of OHS for a work group	MSAPMOHS200A
MSAPMOHS400A	Contribute to OHS management system	MSAPMOHS300A
MSAPMOHS401A	Assess risk	None
MSAPMOHS503A	Maintain the workplace OHS management system	None
MSAPMOHS510A	Manage risk	MSAPMOHS401A
MSAPMOHS601A	Establish workplace OHS management system	MSAPMOHS503A
MSAPMOPS100A	Use equipment	None
MSAPMOPS101A	Make measurements	None
MSAPMOPS102A	Perform tasks to support production	None
MSAPMOPS200A	Operate equipment	None
MSAPMOPS201A	Cut polymer materials	None
MSAPMOPS202A	Fabricate polymer materials	None
MSAPMOPS212A	Use enterprise computers or data systems	None
MSAPMOPS244A	Layout and cut materials	None
MSAPMOPS301A	Treat corrosion	None
MSAPMOPS363A	Organise on site work	None

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MSAPMOPS400A	Optimise process/plant area	MSAPMSUP390A
MSAPMOPS401A	Trial new process or product	None
MSAPMOPS404A	Co-ordinate maintenance	None
MSAPMOPS405A	Identify problems in fluid power system	None
MSAPMOPS406A	Identify problems in electronic control systems	None
MSAPMOPS601A	Design equipment and systems modifications	None
MSAPMPER200C	Work in accordance with an issued permit	None
MSAPMPER201A	Monitor and control work permits	None
MSAPMPER202A	Observe permit work	None
MSAPMPER205C	Enter confined space	MSAPMPER200C
MSAPMPER300C	Issue work permits	RIIRIS201A
MSAPMPER400A	Coordinate permit process	MSAPMPER300C
MSAPMSUP100A	Apply workplace procedures	None
MSAPMSUP101A	Clean workplace or equipment	None
MSAPMSUP102A	Communicate in the workplace	None
MSAPMSUP106A	Work in a team	None
MSAPMSUP172A	Identify and minimise environmental hazards	None
MSAPMSUP200A	Achieve work outcomes	None
MSAPMSUP201A	Receive or despatch goods	None
MSAPMSUP204A	Pack products or materials	None
MSAPMSUP205A	Transfer loads	None
MSAPMSUP210A	Process and record information	None
MSAPMSUP230A	Monitor process operations	None
MSAPMSUP240A	Undertake minor maintenance	None

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MSAPMSUP273A	Handle goods	None
MSAPMSUP280A	Manage conflict at work	None
MSAPMSUP291A	Participate in continuous improvement	None
MSAPMSUP292A	Sample and test materials and product	None
MSAPMSUP300A	Identify and implement opportunities to maximise production efficiencies	MSAPMSUP200A
MSAPMSUP301A	Apply HACCP to the workplace	None
MSAPMSUP303A	Identify equipment faults	None
MSAPMSUP309A	Maintain and organise workplace records	None
MSAPMSUP310A	Contribute to development of plant documentation	None
MSAPMSUP330A	Develop and adjust a production schedule	None
MSAPMSUP382A	Provide coaching/mentoring in the workplace	None
MSAPMSUP383A	Facilitate a team	None
MSAPMSUP390A	Use structured problem solving tools	None
MSAPMSUP400A	Develop and monitor quality systems	None
MSAPMWJ201A	Use high pressure water jetting equipment	None
MSAPMWJ301A	Operate a high pressure water jetting system	None
MSARVG201A	Tow a recreational vehicle safely	None
MSARVS201A	Install LP gas systems in a recreational vehicle	None
MSARVS202A	Repair/service LP gas systems in a recreational vehicle	None
MSARVS301A	Develop and update caravan industry knowledge	None
MSARVS401A	Assess and quote to service a recreational vehicle	None

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MSARVT201A	Apply technical knowledge of recreational vehicle manufacturing to work activities	None
MSATCM301A	Test the mechanical properties of materials	None
MSATCM302A	Monitor basic ferrous melting and casting processes	None
MSATCM303A	Monitor basic non-ferrous melting and casting processes	None
MSATCM304A	Interpret basic binary phase diagrams	None
MSATCM305A	Demonstrate basic knowledge of casting operations	None
MSATCM401A	Prepare and examine metallographic samples	MSATCM304A
MSATCM402A	Monitor and test sands, cores and moulds	None
MSATCM403A	Evaluate mould design and gating	(MSATCM304A MSATCM305A)
MSATCM404A	Undertake and interpret results of chemical analysis on metal samples	None
MSATCM405A	Determine and supervise heat treatment of metal	(MEM06003C MSATCM304A)
MSATCM406A	Apply basic chemistry principles to metallurgy	None
MSATCM501A	Calculate and predict chemical outcomes in metallurgical situations	MSATCM406A
MSATCM502A	Identify and describe equipment for mineral and chemical processing plants	(MSATCM304A MSATCM406A)
MSATCM503A	Recommend a refractory for an application	None
MSATCM504A	Select metal forming process	(MEM30007A MEM09002B MSATCM501A)
MSATCM505A	Select metal joining process	(MEM30007A MEM09002B MSATCM406A)

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MSATCM506A	Monitor blast furnace operations	(MSATCM304A MSATCM406A MSATCM501A)
MSATCM507A	Monitor primary steel making process	(MSATCM304A MSATCM406A MSATCM501A)
MSATCM508A	Monitor secondary steelmaking operations	(MSATCM301A MSATCM304A MSATCM503A)
MSATCM509A	Recommend ferrous and non ferrous metals or alloys for an application	MSATCM304A
MSATCM510A	Apply metallurgical principles and techniques in welding and other thermal processes	MSATCM505A
MSATCM511A	Apply metallurgy principles and practice to determine metal forming and shaping processes	None
MSATCM512A	Apply metallurgy principles and practice to optimise furnace operation	None
MSATCM513A	Plan and complete metallurgical projects	(MEM16008A MEM30012A MEM23061A MEM23071A MSATCM405A MSATCM509A MSATCM510A)
MSATCM514A	Select surface treatment methods for metallic components or products	None
MSATCM515A	Analyse metallurgical failures of components and recommend preventative measures	(MSATCM401A MSATCM406A)
MSATCM516A	Select non metallic materials for engineering applications manufacturing, engineering and structural	None
MSATCM517A	Determine corrosion prevention strategies for metal and alloys	None
MSATCM518A	Interpret complex binary phase diagrams	MSATCM304A

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MSATCS301A	Interpret architectural and engineering design specifications for structural steel detailing	MEM09002B
MSATCS302A	Detail bolts and welds for structural steelwork connections	(MEM05051A MEM09002B MSATCS301A)
MSATCS501A	Detail standardised structural connections	(MEM05051A MEM09002B MSATCS301A)
MSATCS502A	Detail structural steel members	(MEM09002B MSATCS301A)
MSATCS503A	Incorporate structural steel detailing into fabrication and construction project management	None
MSATCS504A	Detail ancillary steelwork	(MEM09002B MSATCS301A)
MSATMINS301A	Inspect a range of simple measures	None
MSATMINS302A	Inspect a range of simple measuring instruments	None
MSATMINS401A	Inspect a range of weighing instruments	None
MSATMINS402A	Inspect a range of liquid measuring instruments using volume measures	None
MSATMINS403A	Inspect a range of trading practices	None
MSATMINS404A	Inspect a range of pre-packaged products	None
MSATMINS501A	Inspect a range of complex measuring instruments	None
MSATMREF301A	Use and maintain reference standards	None
MSATMVER301A	Verify simple measures	None
MSATMVER302A	Verify a simple measuring instruments	None
MSATMVER401A	Verify a limited weighing instrument	None
MSATMVER402A	Verify a liquid measuring instrument using volume measures	None

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MSATMVER403A	Verify inspector's class reference standards	None
MSATMVER501A	Verify a complex measuring instrument	None

Imported units of competency MSA07v8.3

Code	Title	Origin
AUM4003A	Interpret customer requirements	AUM12
AUMANA001	Prepare and document quotation	AUM12
AUMFTA001	Document manufacturing design processes	AUM12
AUMGTT001	Apply trim to vehicle components	AUM12
AURAAA4002	Determine retail rates for work	AUR12
AURACA2001	Establish relations with customers	AUR12
AURACA3002	Establish customer requirements of a complex nature	AUR12
AURACA3003	Build customer relations	AUR12
AURAFA2004	Solve routine problems in an automotive workplace	AUR12
AURAFA5007	Develop and document specifications and procedures	AUR12
AURAKA3002	Adapt work processes to new technologies	AUR12
AURALA3001	Determine legal aspects of an automotive service and repair contract	AUR12
AURAMA3004	Maintain business image	AUR12
AURAMA4005	Manage complex customer issues	AUR12
AURAMA5006	Contribute to business improvement	AUR12
AURANN4001	Prepare a vehicle repair quotation	AUR12
AURATA3005	Estimate complex jobs	AUR12
AURC341903A	Apply relevant finance, leasing and insurance contracts/policies	AUR12

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AURETB3001	Repair electric braking systems	AUR12
AURETR2010	Fabricate, test and repair wiring harnesses and looms	AUR12
AURETR2012	Test and repair basic electrical circuits	AUR12
AURETR2015	Inspect and service batteries	AUR12
AURSAA2001	Process customer complaints	AUR12
AURSBA3002	Apply automotive parts interpretation process	AUR12
AURSCA2001	Select automotive parts and products	AUR12
AURSCA2002	Present stock and sales area	AUR12
AURSCA2003	Apply sales procedures	AUR12
AURSCA2004	Carry out cash, credit and funds transfers	AUR12
AURSCA2005	Sell products	AUR12
AURSCA2006	Promote products and services	AUR12
AURSLA2001	Apply legal requirements relating to product sales	AUR12
AURTNA5001	Estimate and calculate costs to repair, maintain or modify a vehicle	AUR12
AURTTA3017	Carry out vehicle safety and roadworthy inspection	AUR12
AURTTB2001	Inspect and service braking systems	AUR12
AURTTD2004	Inspect and service suspension systems	AUR12
AURTTJ2002	Remove and refit wheel hubs and associated brake components	AUR12
AURTTY3001	Repair chassis, frame and associated components	AUR12
AURV365356A	Read and interpret vehicle body repair estimation/quotation	AUR12
AURVTG3011	Install side windows	AUR12
AURVTN2005	Remove and fit protector mouldings, transfers and decals	AUR12
AURVTN4032	Determine vehicle damage and recommended repair procedures	AUR12

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AURVTP2007	Apply paint touch-up techniques	AUR12
AURVTS3004	Repair fibreglass and composite material components	AUR12
AURVTT3015	Fabricate canvas products	AUR12
AURVTT3016	Fabricate frame structures	AUR12
AURVTT3019	Fabricate and install canopies and curtains	AUR12
BSBCUS501C	Manage quality customer service	BSB07
BSBFIM501A	Manage budgets and financial plans	BSB07
BSBINM501A	Manage an information or knowledge management system	BSB07
BSBMGT403A	Implement continuous improvement	BSB07
BSBMGT502B	Manage people performance	BSB07
BSBWRK510A	Manage employee relations	BSB07
FDFOP2005A	Work in a socially diverse environment	FDF10
FNSORG501A	Develop and manage a budget	FNS10
FPICOT2238A	Cut materials with a hand-held chainsaw	FPI11
LMTCL2001B	Use a sewing machine	LMT07
LMTCL2003B	Identify fibres and fabrics	LMT07
LMTCL2006B	Press work	LMT07
LMTCL2007B	Lay up, mark and cut uncomplicated fabrics and lays	LMT07
LMTCL2008B	Finish garment production	LMT07
LMTGN2008B	Coordinate work of team or section	LMT07
LMTGN4002A	Participate in product engineering	LMT07
LMTGN4016A	Contribute to the development of products or processes	LMT07
LMTGN5004A	Manage installation and commissioning of equipment and systems	LMT07
MEM03001B	Perform manual production assembly	MEM05

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MEM03003B	Perform sheet and plate assembly	MEM05
MEM03004B	Perform electronic/electrical assembly (production)	MEM05
MEM03006B	Set assembly stations	MEM05
MEM05005B	Carry out mechanical cutting	MEM05
MEM05007C	Perform manual heating and thermal cutting	MEM05
MEM05012C	Perform routine manual metal arc welding	MEM05
MEM05050B	Perform routine gas metal arc welding	MEM05
MEM05051A	Select welding processes	MEM05
MEM05052A	Apply safe welding practices	MEM05
MEM06003C	Carry out heat treatment	MEM05
MEM07001B	Perform operational maintenance of machines/equipment	MEM05
MEM07015B	Set computer controlled machines/processes	MEM05
MEM07024B	Operate and monitor machine/process	MEM05
MEM07028B	Operate computer controlled machines/processes	MEM05
MEM08002C	Pre-treat work for subsequent surface coating	MEM05
MEM08007B	Control surface finish production and finished product quality	MEM05
MEM08011B	Prepare surfaces using solvents and/or mechanical means	MEM05
MEM08012B	Prepare surfaces by abrasive blasting (basic)	MEM05
MEM08013B	Prepare surfaces by abrasive blasting (advanced)	MEM05
MEM08014B	Apply protective coatings (basic)	MEM05
MEM08015B	Apply protective coatings (advanced)	MEM05
MEM08016B	Control blast coating by-products, materials and emissions	MEM05
MEM09002B	Interpret technical drawing	MEM05
MEM09005B	Perform basic engineering detail drafting	MEM05

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MEM09006B	Perform advanced engineering detail drafting	MEM05
MEM09009C	Create 2D drawings using computer aided design system	MEM05
MEM09011B	Apply basic engineering design concepts	MEM05
MEM09155A	Prepare mechanical models for computer-aided engineering (CAE)	MEM05
MEM09155A	Prepare mechatronic models for computer-aided engineering (CAE)	MEM05
MEM09157A	Perform mechanical engineering design drafting	MEM05
MEM09158A	Perform mechatronics engineering design drafting	MEM05
MEM09204A	Produce basic engineering detail drawings	MEM05
MEM09205A	Produce electrical schematic drawings	MEM05
MEM09210A	Create 3-D solid models using computer-aided design (CAE) system	MEM05
MEM09216A	Interpret and produce curved 3-D shapes and patterns	MEM05
MEM10002B	Terminate and connect electrical wiring	MEM05
MEM11001C	Erect/dismantle scaffolding and equipment	MEM05
MEM11002C	Erect/dismantle complex scaffolding and equipment	MEM05
MEM11003B	Coordinate erection/dismantling of complex scaffolding/equipment	MEM05
MEM11004B	Undertake dogging	MEM05
MEM11005B	Pick and process order	MEM05
MEM11006B	Perform production packaging	MEM05
MEM11007B	Administer inventory procedures	MEM05
MEM11010B	Operate mobile load shifting equipment	MEM05
MEM11011B	Undertake manual handling	MEM05
MEM11012B	Purchase materials	MEM05
MEM11016B	Order materials	MEM05

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MEM11017B	Organise and lead stocktakes	MEM05
MEM11021B	Perform advanced operation of load shifting equipment	MEM05
MEM11022B	Operate fixed/moveable load shifting equipment	MEM05
MEM12001B	Use comparison and basic measuring devices	MEM05
MEM12002B	Perform electrical/electronic measurement	MEM05
MEM12003B	Perform precision mechanical measurement	MEM05
MEM12005B	Calibrate measuring equipment	MEM05
MEM12006C	Mark off/out (general engineering)	MEM05
MEM12022B	Program coordinate measuring machines (advanced)	MEM05
MEM12023A	Perform engineering measurements	MEM05
MEM12024A	Perform computations	MEM05
MEM12025A	Use graphical techniques and perform simple statistical computations	MEM05
MEM13001B	Perform emergency first aid	MEM05
MEM13002B	Undertake occupational health and safety activities in the workplace	MEM05
MEM13003B	Work safely with industrial chemicals and materials	MEM05
MEM13004B	Work safely with molten metals/glass	MEM05
MEM13010A	Supervise occupational health and safety in an industrial work environment.	MEM05
MEM13013B	Work safely with ionizing radiation	MEM05
MEM13014A	Apply principles of occupational health and safety in the work environment	MEM05
MEM14001B	Schedule material deliveries	MEM05
MEM14002B	Undertake basic process planning	MEM05
MEM14003B	Undertake basic production scheduling	MEM05
MEM14004A	Plan to undertake a routine task	MEM05

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MEM14005A	Plan a complete activity	MEM05
MEM14085A	Apply mechanical engineering analysis techniques	MEM05
MEM14086A	Apply mechatronic engineering analysis techniques	MEM05
MEM14087A	Apply manufactured product design techniques	MEM05
MEM14088A	Apply maintenance engineering techniques to equipment and component repairs and modifications	MEM05
MEM14089A	Integrate mechanical fundamentals into an engineering task	MEM05
MEM14090A	Integrate mechatronic fundamentals into an engineering task	MEM05
MEM14091A	Integrate manufacturing fundamentals into an engineering task	MEM05
MEM14092A	Integrate maintenance fundamentals into an engineering task	MEM05
MEM15001B	Perform basic statistical quality control	MEM05
MEM15002A	Apply quality systems	MEM05
MEM15003B	Use improvement processes in team activities	MEM05
MEM15004B	Perform inspection	MEM05
MEM15005B	Select and control inspection processes and procedures	MEM05
MEM15007B	Conduct product and/or process capability studies	MEM05
MEM15008B	Perform advanced statistical quality control	MEM05
MEM15010B	Perform laboratory procedures	MEM05
MEM15011B	Exercise external quality assurance	MEM05
MEM15012B	Maintain/supervise the application of quality procedures	MEM05
MEM15024A	Apply quality procedures	MEM05
MEM16002C	Conduct formal interviews and negotiations	MEM05
MEM16003B	Provide advanced customer service	MEM05
MEM16005A	Operate as a team member to conduct manufacturing, engineering or related activities	MEM05

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MEM16006A	Organise and communicate information	MEM05
MEM16007A	Work with others in a manufacturing, engineering or related environment	MEM05
MEM16008A	Interact with computing technology	MEM05
MEM16009A	Research and analyse engineering information	MEM05
MEM16010A	Write reports	MEM05
MEM16011A	Communicate with individuals and small groups	MEM05
MEM16012A	Interpret technical specifications and manuals	MEM05
MEM16013A	Operate in a self-directed team	MEM05
MEM17001B	Assist in development and deliver training in the workplace	MEM05
MEM17003A	Assist in the provision of on the job training	MEM05
MEM18001C	Use hand tools	MEM05
MEM18002B	Use power tools/hand held operations	MEM05
MEM18003C	Use tools for precision work	MEM05
MEM18006C	Repair and fit engineering components	MEM05
MEM18010C	Perform equipment condition monitoring and recording	MEM05
MEM18016B	Analyse plant and equipment condition monitoring results	MEM05
MEM18038B	Maintain wheels and tyres	MEM05
MEM18045B	Fault find/repair electrical equipment/components up to 250 volts single phase supply	MEM05
MEM18055B	Dismantle, replace and assemble engineering components	MEM05
MEM22001A	Perform engineering activities	MEM05
MEM22002A	Manage self in the engineering environment	MEM05
MEM22007A	Manage environmental effects of engineering activities	MEM05
MEM22012A	Coordinate resources for an engineering project or operation	MEM05
MEM22013A	Coordinate engineering projects	MEM05

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MEM22014A	Coordinate engineering-related manufacturing operations	MEM05
MEM22015A	Source and estimate engineering materials requirements	MEM05
MEM22017A	Coordinate continuous improvement and technical development in an engineering-related project or operation	MEM05
MEM22018A	Coordinate sales and promotion of engineering-related products or services	MEM05
MEM23001A	Apply advanced mathematical techniques in a manufacturing engineering or related environment	MEM05
MEM23003A	Operate and program computers and/or controllers in engineering situations	MEM05
MEM23004A	Apply technical mathematics	MEM05
MEM23006A	Apply fluid and thermodynamics principles in engineering	MEM05
MEM23007A	Apply calculus to engineering tasks	MEM05
MEM23041A	Apply basic scientific principles and techniques in mechanical engineering situations	MEM05
MEM23063A	Select and test mechanical engineering materials	MEM05
MEM23064A	Select and test mechatronic engineering materials	MEM05
MEM23109A	Apply engineering mechanics principles	MEM05
MEM23111A	Select electrical equipment and components for engineering applications	MEM05
MEM23112A	Investigate electrical and electronic controllers in engineering applications	MEM05
MEM23113A	Evaluate hydrodynamic systems and system components	MEM05
MEM23114A	Evaluate thermodynamic systems and components	MEM05
MEM23115A	Evaluate fluid power systems	MEM05
MEM23116A	Evaluate programmable logic controller and related control system component applications	MEM05
MEM23117A	Evaluate microcontroller applications	MEM05
MEM23118A	Apply production and service control techniques	MEM05

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MEM23119A	Evaluate continuous improvement processes	MEM05
MEM23120A	Select mechanical machine and equipment components	
MEM23121A	Analyse loads on frames and mechanisms	MEM05
MEM23122A	Evaluate computer integrated manufacturing systems	MEM05
MEM23123A	Evaluate manufacturing processes	MEM05
MEM23124A	Measure and analyse noise and vibration	MEM05
MEM23125A	Evaluate maintenance systems	MEM05
MEM24001B	Perform basic penetrant testing	MEM05
MEM24002B	Perform penetrant testing	MEM05
MEM24003B	Perform basic magnetic particle testing	MEM05
MEM24004B	Perform magnetic particle testing	MEM05
MEM24005B	Perform basic eddy current testing	MEM05
MEM24006B	Perform eddy current testing	MEM05
MEM24007B	Perform ultrasonic thickness testing	MEM05
MEM24008B	Perform ultrasonic testing	MEM05
MEM24009B	Perform basic radiographic testing	MEM05
MEM24010B	Perform radiographic testing	MEM05
MEM24011B	Establish non-destructive tests	MEM05
MEM24012C	Apply metallurgy principles	MEM05
MEM30005A	Calculate force systems within simple beam structures	MEM05
MEM30006A	Calculate stresses in simple structures	MEM05
MEM30007A	Select common engineering materials	MEM05
MEM30008A	Apply basic economic and ergonomic concepts to evaluate engineering applications	MEM05
MEM30009A	Contribute to the design of basic mechanical systems	MEM05

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MEM30010A	Set up basic hydraulic circuits	MEM05
MEM30011A	Set up basic pneumatic circuits	MEM05
MEM30012A	Apply mathematical techniques in a manufacturing engineering or related environment	MEM05
MEM30013A	Assist in the preparation of a basic workplace layout	MEM05
MEM30014A	Apply basic just in time systems to the reduction of waste	MEM05
MEM30015A	Develop recommendations for basic set up time improvements	MEM05
MEM30016A	Assist in the analysis of a supply chain	MEM05
MEM30017A	Use basic preventative maintenance techniques and tools	MEM05
MEM30018A	Undertake basic process planning	MEM05
MEM30019A	Use resource planning software systems in manufacturing	MEM05
MEM30020A	Develop and manage a plan for a simple manufacturing related project	MEM05
MEM30021A	Prepare a simple production schedule	MEM05
MEM30022A	Undertake supervised procurement activities	MEM05
MEM30023A	Prepare a simple cost estimate for a manufactured product	MEM05
MEM30024A	Participate in quality assurance techniques	MEM05
MEM30025A	Analyse a simple electrical system circuit	MEM05
MEM30027A	Prepare basic programs for programmable logic controllers	MEM05
MEM30028A	Assist in sales of technical products/systems	MEM05
MEM30031A	Operate computer-aided design (CAD) system to produce basic drawing elements	MEM05
MEM30032A	Produce basic engineering drawings	MEM05
MEM30033A	Use computer-aided design (CAD) to create and display 3-D models	MEM05
MSFFM1002	Operate basic woodworking machines	MSS11

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MSFFM2001	Use furniture making sector hand and power tools	MSS11
MSFFM2002	Assemble furnishing components	MSS11
MSFFM2003	Select and apply hardware	MSS11
MSFFM2005	Join solid timber	MSS11
MSFSF1001	Produce basic soft furnishings accessories	MSS11
MSFSF2001	Cut single layer fabrics	MSS11
MSL913001A	Communicate with other people	MSL09
MSL913002A	Plan and conduct laboratory/field work	MSL09
MSL922001A	Record and present data	MSL09
MSL933001A	Maintain the laboratory/field workplace fit for purpose	MSL09
MSL933002A	Contribute to the achievement of quality objectives	MSL09
MSL933003A	Apply critical control point requirements	MSL09
MSL934001A	Contribute to the ongoing development of HACCP plans	MSL09
MSL934002A	Apply quality system and continuous improvement processes	MSL09
MSL943001A	Work safely with instruments that emit ionising radiation	MSL09
MSL943002A	Participate in laboratory/field workplace safety	MSL09
MSL952001A	Collect routine site samples	MSL09
MSL952002A	Handle and transport samples or equipment	MSL09
MSL953001A	Receive and prepare samples for testing	MSL09
MSL954001A	Obtain representative samples in accordance with sampling plan	MSL09
MSL963001A	Operate basic handblowing equipment	MSL09
MSL963002A	Repair glass apparatus using simple glassblowing equipment	MSL09
MSL973001A	Perform basic tests	MSL09
MSL973002A	Prepare working solutions	MSL09

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MSL973003A	Prepare culture media	MSL09
MSL973004A	Perform aseptic techniques	MSL09
MSL973005A	Assist with fieldwork	MSL09
MSL973006A	Prepare trial batches for evaluation	MSL09
MSL973007A	Perform microscopic examination	MSL09
MSL973012A	Assist with geotechnical site investigations	MSL09
MSL974001A	Prepare, standardise and use solutions	MSL09
MSL974002A	Conduct geotechnical site investigations	MSL09
MSL974003A	Perform chemical tests and procedures	MSL09
MSL974005A	Perform physical tests	MSL09
MSL974010A	Perform mechanical tests	MSL09
MSL975016A	Perform complex tests to measure engineering properties of materials	MSL09
MSS015002A	Develop strategies for more sustainable use of resources	MSS11
MSS015015A	Evaluate sustainability impact of a process	MSS11
MSS402001A	Apply competitive systems and practices	MSS11
MSS402002A	Sustain process improvements	MSS11
MSS402010A	Manage the impact of change on own work	MSS11
MSS402020A	Apply quick changeover procedures	MSS11
MSS402021A	Apply Just in Time procedures	MSS11
MSS402030A	Apply cost factors to work practices	MSS11
MSS402031A	Interpret product costs in terms of customer requirements	MSS11
MSS402040A	Apply 5S procedures	MSS11
MSS402050A	Monitor process capability	MSS11
MSS402051A	Apply quality standards	MSS11

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MSS402060A	Use planning software systems in operations	MSS11
MSS402061A	Use SCADA systems in operations	MSS11
MSS402080A	Undertake root cause analysis	MSS11
MSS402081A	Contribute to the application of a proactive maintenance strategy	MSS11
MSS403001A	Implement competitive systems and practices	MSS11
MSS403002A	Ensure process improvements are sustained	MSS11
MSS403010A	Facilitate change in an organisation implementing competitive systems and practices	MSS11
MSS403011A	Facilitate implementation of competitive systems and practices	MSS11
MSS403013A	Lead team culture improvement	MSS11
MSS403021A	Facilitate a Just in Time system	MSS11
MSS403030A	Improve cost factors in work practices	MSS11
MSS403032A	Analyse manual handling processes	MSS11
MSS403040A	Facilitate and improve implementation of 5S	MSS11
MSS403041A	Facilitate breakthrough improvements	MSS11
MSS403051A	Mistake proof an operational process	MSS11
MSS404050A	Undertake process capability improvements	MSS11
MSS404052A	Apply statistics to operational processes	MSS11
MSS404060A	Facilitate the use of planning software systems in a work area or team	MSS11
MSS404061A	Facilitate the use of SCADA systems in a team or work area	MSS11
MSS404081A	Undertake proactive maintenance analyses	MSS11
MSS404082A	Assist in implementing a proactive maintenance strategy	MSS11
MSS404083A	Support proactive maintenance	MSS11
MSS405001A	Develop competitive systems and practices for an	MSS11

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	organisation	
MSS405002A	Analyse and map a value stream	MSS11
MSS405003A	Manage a value stream	MSS11
MSS405004A	Develop business plans in an organisation implementing competitive systems and practices	MSS11
MSS405005A	Manage competitive systems and practices responding to individual and unique customer orders	MSS11
MSS405010A	Manage relationships with non-customer external organisations	MSS11
MSS405011A	Manage people relationships	MSS11
MSS405012A	Manage workplace learning	MSS11
MSS405020A	Develop quick changeover procedures	MSS11
MSS405021A	Develop a Just in Time system	MSS11
MSS405022A	Design a process layout	MSS11
MSS405023A	Develop a levelled pull system for operations and processes	MSS11
MSS405030A	Optimise cost of product or service	MSS11
MSS405031A	Undertake value analysis of a product or process costs in terms of customer requirements	MSS11
MSS405032A	Analyse cost implications of maintenance strategy	MSS11
MSS405040A	Manage 5S system in an organisation	MSS11
MSS405041A	Implement improvement systems in an organisation	MSS11
MSS405050A	Determine and improve process capability	MSS11
MSS405052A	Design an experiment	MSS11
MSS405053A	Manage application of six sigma for process control and improvement	MSS11
MSS405060A	Develop the application of enterprise control systems in an organisation	MSS11
MSS405061A	Determine and establish information collection requirements and processes	MSS11

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MSS405070A	Develop and manage sustainable energy practices	MSS11
MSS405075A	Facilitate the development of a new product*	MSS11
MSS405081A	Develop a proactive maintenance strategy	MSS11
MSS405082A	Adapt a proactive maintenance strategy to the process operations sector	MSS11
MSS405083A	Adapt a proactive maintenance strategy for a seasonal or cyclical business	MSS11
PMAOHS310B	Investigate incidents	PMA08
PMAOHS420B	Develop First Aid procedures and manage resources	PMA08
PMAOMIR407B	Audit incident preparedness and established response system	PMA08
PMAOMIR418B	Coordinate incident response	PMA08
PMAOMIR424B	Develop and maintain community relationships	PMA08
PMAOMIR430B	Conduct and assess incident exercises	PMA08
PMAOMIR444B	Develop incident containment tactics	PMA08
PMAOMIR449B	Monitor legal compliance obligations during incidents	PMA08
PMAOPS101C	Read dials and indicators	PMA08
PMAOPS280B	Interpret process plant schematics	PMA08
PMAOPS350B	Match and adjust colour	PMA08
PMAOPS402A	Respond to abnormal process situations	PMA08
PMAOPS405A	Operate complex control systems	PMA08
PMAOPS410B	Monitor remote production facilities	PMA08
PMAOPS411B	Manage plant shutdown and restart	PMA08
PMAOPS450B	Solve colour problems	PMA08
PMAOPS500A	Optimise production systems	PMA08
PMAOPS550B	Develop a colour formulation	PMA08
PMAOPS600C	Modify plant	PMA08

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PMASUP410B	Develop plant documentation	PMA08
PMASUP420B	Minimise environmental impact of process	PMA08
PMASUP432B	Coordinate pipeline projects	PMA08
PMASUP440B	Commission/recommission plant	PMA08
PMASUP441C	Decommission plant	PMA08
PMASUP445A	Participate in HAZOP studies	PMA08
PMASUP520B	Review procedures to minimise environmental impact of process	PMA08
PMASUP540B	Analyse equipment performance	PMA08
PMBFIN201C	Finish products and components	PMB07
PMBFIN205C	Hand decorate products	PMB07
PMBHAN103C	Shift materials safely by hand	PMB07
PMBPREP205C	Assemble materials and equipment for production	PMB07
PMBPREP206C	Prepare materials to formulae	PMB07
PMBPREP301C	Set up and prepare for production	PMB07
PMBPREP303C	Set up equipment for continuous operation	PMB07
PMBPREP304C	Set a die	PMB07
PMBPREP305B	Change extrusion die and setup	PMB07
PMBPROD221B	Operate rotational moulding equipment	PMB07
PMBPROD235C	Use materials and process knowledge to complete work operations	PMB07
PMBPROD236C	Operate hand held air/power equipment for production processes	PMB07
PMBPROD240C	Cut materials	PMB07
PMBPROD241C	Lay up rubber lining or lag pulleys	PMB07
PMBPROD242A	Bond polymers to surfaces	PMB07

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PMBPROD247C	Hand lay up composites	PMB07
PMBPROD248C	Prepare surfaces for coating	PMB07
PMBPROD265C	Operate portable vulcanising equipment	PMB07
PMBPROD321B	Produce rotational moulded products	PMB07
PMBPROD323C	Produce powder coated products	PMB07
PMBPROD347B	Produce composites using hand lamination	PMB07
PMBPROD375B	Vulcanise products using an autoclave	PMB07
PMBPROD380B	Produce composites using chopper gun/depositor	PMB07
PMBPROD430B	Trial a new die/tool	PMB07
PMBPROD431B	Trial a new, advanced or complex mould	PMB07
PMBTECH301B	Use material and process knowledge to solve problems	PMB07
PMBTECH302A	Modify existing compounds	PMB07
PMBTECH303A	Make minor modifications to products	PMB07
PMBTECH401B	Predict polymer properties and characteristics	PMB07
PMBTECH402B	Set advanced or complex dies	PMB07
PMBTECH403B	Test fibre-composites materials and laminates	PMB07
PMBTECH404B	Mould chemical resistant and/or fire retardant fibre-composites	PMB07
PMBTECH405B	Repair damaged fibre-composites structures	PMB07
PMBTECH406A	Diagnose production equipment problems	PMB07
PMBTECH501B	Analyse equipment performance	PMB07
PMBTECH502B	Review and analyse production trials and specify retrials	PMB07
PMBTECH503B	Determine rheology and output of plastics materials from processing equipment	PMB07
PMBTECH504B	Determine heat transfer loads for processing equipment	PMB07
PMBTECH505B	Choose polymer materials for an application	PMB07

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PMBTECH506B	Analyse the design of products and tools	PMB07
PMBTECH507B	Develop fibre composite products using cored-laminate techniques	PMB01
PMBTECH508A	Develop a new compound	PMB07
PMBTECH509A	Modify an existing product	PMB07
PMBTECH510A	Analyse failure in polymeric materials	PMB07
PMBTECH601B	Develop a new product	PMB07
PMBTECH602B	Develop a new die or tool	PMB07
PMBTECH603B	Design structural/mechanical polymer components	PMB07
PMC554020D	Design and prepare models, moulds and dies	PMC10
PMC554090B	Undertake simple refractory design	PMC10
PMC554091B	Analyse refractory failures	PMC10
PSPGOV408A	Value diversity	PSP04
PSPPM402B	Manage simple projects	PSP04
PSPPM501B	Design complex projects	PSP04
PSPPM502B	Manage complex projects	PSP04
PSPPM503B	Close complex projects	PSP04
RIIRIS201B	Conduct local risk control	RII09
RIIOHS204A	Work safely at heights	RII09
SIRXCCS201	Apply point-of-sale handling procedures	SIR07
SIRXINV004A	Buy merchandise	SIR07
SIRXMER004A	Manage merchandise and store presentation	SIR07
SIRXMER303	Coordinate merchandise presentation	SIR07
SIRXRSK001A	Minimise theft	SIR07
SIRXRSK002A	Maintain store security	SIR07

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SIRXSLS002A	Advise on products and services	SIR07
SITXMGT501	Establish and conduct business relationships	SIT07
SITXMPR401	Coordinate production of brochures and marketing materials	SIT07
SITXMPR402	Create a promotional display or stand	SIT07
SITXMPR404	Coordinate marketing activities	SIT07
TAEASS401B	Plan assessment activities and processes	TAE10
TAEASS402B	Assess competence	TAE10
TAEASS403B	Participate in assessment validation	TAE10
TAEDEL301A	Provide work skill instruction	TAE10
TLIA5058A	Manage facility and inventory requirements	TLI10
TLID2010A	Operate a forklift	TLI10
TLIL4059A	Implement asset management systems	TLI10
TLIL5055A	Manage a supply chain	TLI10
TLIP4013A	Implement and monitor logistics planning and process	TLI10
TLIR4003A	Negotiate a contract	TLI10
TLIR4008A	Implement and supervise stocktaking procedures	TLI10
TLIR4009A	Implement purchasing systems	TLI10
TLIR4010A	Plan purchasing	TLI10
TLIR5005A	Manage a contract	TLI10
TLIR5006A	Develop, implement and review purchasing strategies	TLI10
TLIX5015A	Establish supply chains	TLI10
UEGNSG604B	Fill gas cylinders	UEG06
UEPMNT420A	Perform Electrical/Electronic Drafting	UEP06

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Mapping MSA07v8

New units of competency

Code	Title	Comment
MSABLIC001	License to operate a standard boiler	New licensing unit of competency – not aligned to any qualifications
MSABLIC002	License to operate an advanced boiler	New licensing unit of competency – not aligned to any qualifications

Qualifications in MSA07v8

MSA07v7 Code	MSA07v8 Code	Title	Comment
MSA10107	MSA10107	Certificate I in Manufacturing (Pathways)	No change
MSA10207	MSA10207	Certificate I in Process Manufacturing	No change
MSA20107	MSA20107	Certificate II in Process Manufacturing	CM units replaced by MSS units - E
MSA20208	MSA20208	Certificate II in Manufacturing Technology	CM units replaced by MSS units - E
MSA20510	MSA20510	Certificate II in Recreational Vehicle Service and Repair	CM units replaced by MSS units - E
MSA20610	MSA20610	Certificate II in Recreational Vehicle Manufacture	CM units replaced by MSS units - E
MSA30107	MSA30107	Certificate III in Process Manufacturing	CM units replaced by MSS units - E
MSA30208	MSA30208	Certificate III in Manufacturing Technology	CM units replaced by MSS units - E

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MSA07v7 Code	MSA07v8 Code	Title	Comment
MSA30309	MSA30309	Certificate III in Surface Preparation and Coating Application	Imported unit code updated. Minor formatting - E
MSA30510	MSA30510	Certificate III in Recreational Vehicle Service and Repair	CM units replaced by MSS units - E
MSA30610	MSA30610	Certificate III in Recreational Vehicle Manufacture	CM units replaced by MSS units - E
MSA30710	MSA30710	Certificate III in Recreational Vehicle and Accessories Retailing	Imported unit code updated. Minor formatting - E
MSA40108	MSA40108	Certificate IV in Manufacturing Technology	CM units replaced by MSS units - E
MSA40311	MSA40311	Certificate IV in Process Manufacturing	CM units replaced by MSS units - E
MSA40510	MSA40510	Certificate IV in Recreational Vehicles	CM units replaced by MSS units - E
MSA40710	MSA40710	Certificate IV in Recreational Vehicle and Accessories Retailing	CM units replaced by MSS units - E
MSA50108	MSA50108	Diploma of Manufacturing Technology	CM units replaced by MSS units - E
MSA50311	MSA50311	Diploma of Production Management	CM units replaced by MSS units - E
MSA50510	MSA50510	Diploma of Recreational Vehicles	CM units replaced by MSS units - E
MSA60108	MSA60108	Advanced Diploma of Manufacturing Technology	CM units replaced by MSS units - E

Mapping of Competitive Manufacturing qualifications to new Competitive Systems and Practices Qualifications (endorsed in MSS11)

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MSA07 Code	**MSA07 Title**	**MSS11v2 Code**	**MSS11v2 Title**	**Comment/ equivalence**
MSA21108	Certificate II in Competitive Manufacturing	MSS20312	Certificate II in Competitive Systems and Practices	Equivalent outcomes - increased choice of electives
MSA31108	Certificate III in Competitive Manufacturing	MSS30312	Certificate III in Competitive Systems and Practices	Equivalent outcomes - increased choice of electives and unit requirement increased
MSA41108	Certificate IV in Competitive Manufacturing	MSS40312	Certificate IV in Competitive Systems and Practices	Equivalent outcomes - increased choice of electives and unit requirement increased
MSA51108	Diploma of Competitive Manufacturing	MSS50312	Diploma of Competitive Systems and Practices	Equivalent outcomes - increased choice of electives
MSA61108	Advanced Diploma of Competitive Manufacturing	MSS60312	Advanced Diploma of Competitive Systems and Practices	Equivalent outcomes - increased choice of electives
MSA71109	Vocational Graduate Certificate in Competitive Manufacturing	MSS70312	Vocational Graduate Certificate in Competitive Systems and Practices	Equivalent outcomes - increased choice of electives
MSA81109	Vocational Graduate Diploma of Competitive Manufacturing	MSS80312	Vocational Graduate Diploma of Competitive Systems and Practices	Equivalent outcomes - increased choice of electives

Mapping of MSA07 competitive manufacturing units to new competitive systems and practices units of competency (endorsed in MSS11v2)

MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
		MSS402041A	Apply 5S in an office	New Unit

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MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
		MSS402052A	Implement continuous improvements based on standardised work practices	New Unit
		MSS402053A	Participate in breakthrough improvements in an office	New Unit
		MSS403006A	Facilitate implementation of competitive systems and practices in an office	New Unit
		MSS403007A	Map an office value stream	New Unit
		MSS403024A	Work within a constrained process	New Unit
		MSS403033A	Map an operational process	New Unit
		MSS403034A	Organise products into groups	New Unit
		MSS403035A	Implement the visual workplace	New Unit
		MSS403039A	Facilitate and improve 5S in an office	New Unit
		MSS403042A	Facilitate mistake proofing in an office	New Unit
		MSS403043A	Facilitate breakthrough improvements in an office	New Unit
		MSS403044A	Facilitate continuous	New Unit

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MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
			improvement through the use of standardised procedures and practices	
		MSS403084A	Improve changeovers	New Unit
		MSS405024A	Apply the theory of constraints	New Unit
		MSS405033A	Optimise office systems to deliver to customer demand	New Unit
MSACMC210A	Manage the impact of change on own work	MSS402010A	Manage the impact of change on own work	E
MSACMC410A	Lead change in a manufacturing environment	MSS403010A	Facilitate change in an organisation implementing competitive systems and practices	E Alignment corrected
MSACMC411A	Lead a competitive manufacturing team	MSS403011A	Facilitate implementation of competitive systems and practices	NE Element 3 changed Alignment corrected
MSACMC413A	Lead team culture improvement	MSS403013A	Lead team culture improvement	E Alignment corrected
MSACMC610A	Manage relationships with non-customer external organisations	MSS405010A	Manage relationships with non-customer external organisations	E Alignment corrected
MSACMC611A	Manage people relationships	MSS405011A	Manage people relationships	NE New Element 1

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MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
				Alignment corrected
MSACMC612A	Manage workplace learning	MSS405012A	Manage workplace learning	NE Changed Element 1 including two new PCs Alignment corrected
MSACMC613A	Facilitate holistic culture improvement in a manufacturing enterprise	MSS405013A	Facilitate holistic culture improvement in an organisation	NE Element 2 and PCs changed Alignment corrected
MSACMC614A	Develop a communications strategy to support production	MSS405014A	Develop a communications strategy to support operations	E Alignment corrected
MSACMG700A	Review continuous improvement processes	MSS407013A	Review continuous improvement processes	E
MSACMG701A	Prepare for and implement change	MSS407001A	Prepare for and implement change	E
MSACMG702A	Review manufacturing practice tools and techniques	MSS407002A	Review operations practice tools and techniques	E
MSACMG703A	Analyse process changes	MSS407003A	Analyse process changes	E
MSACMG704A	Facilitate improvements in the internal value chain	MSS407004A	Facilitate improvements in the internal value stream	E
MSACMG70	Undertake a	MSS407005A	Undertake a	E

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MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
5A	qualitative review of a process change		qualitative review of a process change	
MSACMG706A	Build relationships between teams in a manufacturing environment	MSS407006A	Build relationships between teams in an operations environment	E
MSACMG707A	Respond to a major non-conformance	MSS407007A	Respond to a major non-conformance	E
MSACMG708A	Capture learning from daily activities in a manufacturing organisation	MSS407008A	Capture learning from daily activities in a organisation	E
MSACMG709A	Facilitate improvements in the external value chain	MSS407009A	Facilitate improvements in the external value stream	E
MSACMG710A	Improve visual management in the workplace	MSS407010A	Improve visual management in the workplace	E
MSACMG711A	Manage benchmarking studies	MSS407011A	Manage benchmarking studies	E
MSACMG712A	Lead a problem solving process to determine and solve root cause	MSS407012A	Lead a problem solving process to determine and solve root cause	E
MSACMG800A	Analyse data for relevance to organisational learning	MSS408008A	Analyse data for relevance to organisational learning	E
MSACMG801A	Develop the competitive manufacturing approach	MSS408001A	Develop the competitive systems and practices approach	E
MSACMG802A	Audit the use of competitive tools	MSS408002A	Audit the use of competitive tools	NE

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MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
				New PC 1.2
MSACMG803A	Develop models of future state manufacturing practice	MSS408003A	Develop models of future state operations practice	E
MSACMG804A	Develop the value chain	MSS408004A	Develop the value stream	E
MSACMG805A	Develop the learning processes of the manufacturing organisation	MSS408005A	Develop the learning processes of the operations organisation	E
MSACMG806A	Develop and refine systems for continuous improvement in manufacturing organisations	MSS408006A	Develop and refine systems for continuous improvement in operations	E
MSACMG807A	Develop problem solving capability of a manufacturing organisation	MSS408007A	Develop problem solving capability of an organisation	NE New PCs in Elements 1 and 2
MSACMS200A	Apply competitive manufacturing practices	MSS402001A	Apply competitive systems and practices	E Element 1 reworded, PCs not changed
MSACMS201A	Sustain process improvements	MSS402002A	Sustain process improvements	NE New Element 1 New Critical Aspects
MSACMS400A	Implement a competitive manufacturing system	MSS403001A	Implement competitive systems and practices	E Alignment corrected

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MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
MSACMS401A	Ensure process improvements are sustained	MSS403002A	Ensure process improvements are sustained	NE New Element Alignment corrected
MSACMS405A	Lead a manufacturing team using a balanced score card approach	MSS403005A	Facilitate use of a Balanced Scorecard for performance improvement	E Alignment corrected
MSACMS600A	Develop a competitive manufacturing system	MSS405001A	Develop competitive systems and practices for an organisation	E Alignment corrected
MSACMS601A	Analyse and map a value chain* MSACMT631A Undertake value analysis of product costs in terms of customer requirements	MSS405002A	Analyse and map a value stream	NE Prerequisite removed Alignment corrected
MSACMS602A	Manage a value chain* MSACMS601A Analyse and map a value chain MSACMT631A Undertake value analysis of product costs in terms of customer requirements	MSS405003A	Manage a value stream	NE Prerequisites removed Alignment corrected
MSACMS603A	Develop manufacturing related business plans	MSS405004A	Develop business plans in an organisation implementing competitive systems and practices	E Alignment corrected

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MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
MSACMS604A	Manage competitive manufacturing processes in a jobbing shop environment* MSACMS601A Analyse and map a value chain MSACMT280A Undertake root cause analysis MSACMT631A Undertake value analysis of product costs in terms of customer requirements	MSS405005A	Manage competitive systems and practices responding to individual and unique customer orders	NE Prerequisites removed Alignment corrected
MSACMS605A	Develop a Balanced Scorecard for use in competitive manufacturing* MSACMS601A Analyse and map a value chain MSACMT280A Undertake root cause analysis MSACMT631A Undertake value analysis of product costs in terms of customer requirements	MSS405006A	Develop a Balanced Scorecard	NE Prerequisites removed Alignment corrected
MSACMS606A	Introduce competitive manufacturing to a small or medium enterprise	MSS405007A	Introduce competitive systems and practices to a small or medium enterprise	E Alignment corrected
MSACMT22	Apply quick	MSS402020A	Apply quick	E

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MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
0A	changeover procedures		changeover procedures	
MSACMT221A	Apply Just in Time (JIT) procedures	MSS402021A	Apply Just in Time procedures	E
MSACMT230A	Apply cost factors to work practices	MSS402030A	Apply cost factors to work practices	E
MSACMT231A	Interpret product costs in terms of customer requirements	MSS402031A	Interpret product costs in terms of customer requirements	E
MSACMT240A	Apply 5S procedures in a manufacturing environment	MSS402040A	Apply 5S procedures	E
MSACMT250A	Monitor process capability	MSS402050A	Monitor process capability	E
MSACMT251A	Apply quality standards	MSS402051A	Apply quality standards	E
MSACMT260A	Use planning software systems in manufacturing	MSS402060A	Use planning software systems in operations	NE Additional PCs in Elements 1 and 2
MSACMT261A	Use SCADA systems in manufacturing	MSS402061A	Use SCADA systems in operations	E
MSACMT270A	Use sustainable energy practices			Not carried forward. Replaced by MSAENV272B Includes similar content, but not equivalent
MSACMT271A	Use sustainable environmental			Not carried forward. Replaced by

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MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
	practices			MSAENV272B Equivalent outcomes
MSACMT280A	Undertake root cause analysis	MSS402080A	Undertake root cause analysis	E
MSACMT281A	Contribute to the application of a proactive maintenance strategy	MSS402081A	Contribute to the application of a proactive maintenance strategy	E
MSACMT421A	Facilitate a Just in Time (JIT) system	MSS403021A	Facilitate a Just in Time system	E Alignment corrected
MSACMT423A	Monitor a manufacturing levelled pull system* MSACMT280A-Undertake root cause analysis	MSS403023A	Monitor a levelled pull system of operations	NE Prerequisite removed Alignment corrected
MSACMT430A	Improve cost factors in work practices	MSS403030A	Improve cost factors in work practices	E Alignment corrected
MSACMT432A	Analyse manual handling processes	MSS403032A	Analyse manual handling processes	E Alignment corrected
MSACMT440A	Lead 5S in a manufacturing environment	MSS403040A	Facilitate and improve implementation of 5S	NE New Element 2 Alignment corrected
MSACMT441A	Facilitate continuous improvement in manufacturing	MSS403041A	Facilitate breakthrough improvements	NE 3 new Elements Alignment corrected

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MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
MSACMT450A	Undertake process capability improvements* MSACMT452A Apply statistics to processes in manufacturing	MSS404050A	Undertake process capability improvements* MSS404052A Apply statistics to operational processes	E
MSACMT451A	Mistake proof a production process	MSS403051A	Mistake proof an operational process	E Alignment corrected
MSACMT452A	Apply statistics to processes in manufacturing	MSS404052A	Apply statistics to operational processes	E
MSACMT453A	Use six sigma techniques* MSACMT452A Apply statistics to processes in manufacturing	MSS404053A	Use six sigma techniques* MSS404052A Apply statistics to operational processes	E
MSACMT460A	Facilitate the use of planning software systems in manufacturing* MSACMT260A Use planning software systems in manufacturing	MSS404060A	Facilitate the use of planning software systems in a work area or team	NE New Element 1 Prerequisite removed
MSACMT461A	Facilitate SCADA systems in a manufacturing team or work area* MSACMT261A Use SCADA systems in manufacturing	MSS404061A	Facilitate the use of SCADA systems in a team or work area	NE Prerequisite removed
MSACMT481A	Undertake proactive maintenance	MSS404081A	Undertake proactive maintenance	E

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MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
	analyses		analyses	
MSACMT482A	Assist in implementing a proactive maintenance strategy	MSS404082A	Assist in implementing a proactive maintenance strategy	E
MSACMT483A	Support proactive maintenance	MSS404083A	Support proactive maintenance	E
MSACMT620A	Develop quick changeover procedures	MSS405020A	Develop quick changeover procedures	E Alignment corrected
MSACMT621A	Develop a Just in Time (JIT) system* MSACMC410A Lead change in a manufacturing environment	MSS405021A	Develop a Just in Time system	NE Prerequisite removed Alignment corrected
MSACMT622A	Design a process layout	MSS405022A	Design a process layout	E Alignment corrected
MSACMT623A	Develop a levelled pull system of manufacturing	MSS405023A	Develop a levelled pull system for operations and processes	E Alignment corrected
MSACMT630A	Optimise cost of product* MSACMT631A Undertake value analysis of product costs in terms of customer requirements	MSS405030A	Optimise cost of product or service	NE Prerequisite removed Alignment corrected
MSACMT631A	Undertake value analysis of product costs in terms of customer	MSS405031A	Undertake value analysis of a product or process costs in terms of customer	NE Many changes to PCs

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MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
	requirements* MSACMT230A Apply cost factors to work practices		requirements	Prerequisite removed Alignment corrected
MSACMT632A	Analyse cost implications of maintenance strategy	MSS405032A	Analyse cost implications of maintenance strategy	E Alignment corrected
MSACMT640A	Manage 5S system in a manufacturing environment	MSS405040A	Manage 5S system in an organisation	E Alignment corrected
MSACMT641A	Implement a continuous improvement system	MSS405041A	Implement improvement systems in an organisation	NE New and changed Elements and PCs Alignment corrected
MSACMT650A	Determine and improve process capability* MSACMT452A Apply statistics to processes in manufacturing	MSS405050A	Determine and improve process capability* MSS404052A Apply statistics to operational processes	E Alignment corrected
MSACMT652A	Design an experiment* MSACMT452A Apply statistics to processes in manufacturing	MSS405052A	Design an experiment* MSS404052A Apply statistics to operational processes	E Alignment corrected
MSACMT653A	Apply six sigma to process control and improvement* MSACMT452A Apply statistics to processes in	MSS405053A	Manage application of six sigma for process control and improvement* MSS404052A Apply statistics to	E Alignment corrected

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MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
	manufacturing		operational processes	
MSACMT660A	Develop the application of enterprise systems in manufacturing	MSS405060A	Develop the application of enterprise control systems in an organisation	E Alignment corrected
MSACMT661A	Determine and establish information collection requirements and processes	MSS405061A	Determine and establish information collection requirements and processes	E Alignment corrected
MSACMT662A	Develop a documentation control strategy for a manufacturing enterprise	MSS405062A	Develop a documentation control strategy for an organisation	E Alignment corrected
MSACMT670A	Develop and manage sustainable energy practices	MSS405070A	Develop and manage sustainable energy practices	E Alignment corrected
MSACMT671A	Develop and manage sustainable environmental practices			Not carried forward. Replaced by MSS015002A Equivalent outcomes
MSACMT675A	Facilitate the development of a new product* MSACMT452A Apply statistics to processes in manufacturing	MSS405075A	Facilitate the development of a new product* MSS404052A Apply statistics to operational processes	E Alignment corrected
MSACMT681A	Develop a proactive maintenance strategy	MSS405081A	Develop a proactive maintenance strategy	E Alignment corrected

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MSA07 unit code	**MSA07 unit title**	**MSS11v2 unit code**	**MSS11v2 unit title**	**Comment/ equivalence**
MSACMT682A	Adapt a proactive maintenance strategy to the process manufacturing sector* MSACMT681A Develop a proactive maintenance strategy	MSS405082A	Adapt a proactive maintenance strategy to the process operations sector* MSS405081A Develop a proactive maintenance strategy	E Alignment corrected
MSACMT683A	Adapt a proactive maintenance strategy for a seasonal or cyclical manufacturing operation* MSACMT681A Develop a proactive maintenance strategy	MSS405083A	Adapt a proactive maintenance strategy for a seasonal or cyclical business* MSS405081A Develop a proactive maintenance strategy	E Alignment corrected

Mapping MSA07v8.1

Units of competency

Code	**Title**	**Comment**
MSABLIC001	License to operate a standard boiler	Release 2 - Content reinstated following Safe Work Australia approval
MSABLIC002	License to operate an advanced boiler	Release 2 - Content reinstated following Safe Work Australia approval

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Mapping MSA07v8.2

MSA qualifications not carried forward

Notes:

- The Competitive Manufacturing qualifications were superseded in April 2012 by the Competitive Systems and Practices qualifications endorsed in MSS11v2.
- The Competitive Manufacturing qualifications have not been carried forward in version 8.2 of MSA07, but remain available in the system as part of previous versions of this Training Package.
- Refer to the summary mapping in MSS11v2 for details: MSS11.

Code	Title	Comment
MSA21108	Certificate II in Competitive Manufacturing	Superseded by MSS20312
MSA31108	Certificate III in Competitive Manufacturing	Superseded by MSS30312
MSA41108	Certificate IV in Competitive Manufacturing	Superseded by MSS40312
MSA51108	Diploma of Competitive Manufacturing	Superseded by MSS50312
MSA61108	Advanced Diploma of Competitive Manufacturing	Superseded by MSS60312
MSA71109	Vocational Graduate Certificate II in Competitive Manufacturing	Superseded by MSS70312
MSA81109	Vocational Graduate Diploma of Competitive Manufacturing	Superseded by MSS80312

MSA units not carried forward

Code	Comment
All MSACM units	Superseded by new units endorsed in MSS11v2 – Refer to MSS11v2 for details

Updated Skill Sets

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Code	Title	Comment
MSASS00004	Leading Hand_Supervisor	New Release – Unit grid updated – no change in outcomes
MSASS00005	Licence to operate a standard boiler	New Release – Title corrected to 'licence' – no change in outcomes
MSASS00006	Licence to operate an advanced boiler	New Release - Title corrected to 'licence' – no change in outcomes

Updated qualifications

Code	Title	Comment
MSA20510	Certificate II in Recreational Vehicle Service and Repair	New release – AU imported elective units updated
MSA20610	Certificate II in Recreational Vehicle Manufacture	New release – Au imported elective units updated
MSA30107	Certificate III in Process Manufacturing	New release - One MEM imported elective unit updated
MSA30208	Certificate III in Manufacturing Technology	New release - MEM imported elective units updated
MSA30510	Certificate III in Recreational Vehicle Service and Repair	New release – AU imported elective units updated
MSA30610	Certificate III in Recreational Vehicle Manufacture	New release – AU imported elective units updated
MSA30710	Certificate III in Recreational Vehicle and Accessories and Retailing	New release – AU and SI imported elective units updated
MSA40108	Certificate IV in Manufacturing Technology	New release - MEM imported elective units updated
MSA40311	Certificate IV in Process Manufacturing	New release - MEM and TAE imported elective units updated

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MSA40510	Certificate IV in Recreational Vehicles	New release – AU and TAE imported elective units updated, plus one MEM unit
MSA40710	Certificate IV in Recreational Vehicle and Accessories Retailing	New release – AU, SI and TAE imported elective units updated, plus one MEM unit
MSA50108	Diploma of Manufacturing	New release – MEM imported elective units updated and additional MEM elective units added
MSA50311	Diploma of Production Management	New release – One BSB imported elective unit updated
MSA50510	Diploma of Recreational Vehicles	New release – AU imported elective units updated, two MEM imported elective units updated, one new MEM elective unit added
MSA60108	Advanced Diploma of Manufacturing Technology	New release – MEM imported elective units updated and additional MEM elective units added

Updated units of competency

Code	Title	Comment
MSAPMOHS510	Assess risk	New release – updated to be consistent with ISO 31000:2009 Risk Management – Principles and Guidelines. Previous unit referred to Australian Standard (AS/NZS4360, 1999). Equivalent
MSAPMOPS100A	Use equipment	New release – Minor clarification changes to application and range, and minor editorial corrections. Equivalent
MSAPMOPS200A	Operate equipment	New release – Minor clarifications to application and range, and minor editorial corrections.
MSAPMSUP30	Identify and implement	New release 2 - Error in title of prerequisite

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0A	opportunities to maximise production efficiencies	unit corrected - Equivalent. No change to the prerequisite.
MSABLIC001	Licence to operate a standard boiler	New Release – Title corrected to 'licence' – no change in outcomes
MSABLIC002	Licence to operate an advanced boiler	New Release - Title corrected to 'licence' – no change in outcomes

Imported units not carried forward

Code	Title	Comment	E/NE
AUM3003B	Document designs	Replaced by AUMFTA3001	E
AUM8012B	Prepare and document quotation	Replaced by AUMANA3001	E
AUM8081B	Apply trim to components	Replaced by AUMGTT2001	E
AURA354616A	Determine legal aspects of an automotive service and repair contract	Replaced by AURALA3001	E
AURA454516A	Determine retail rates for work	Replaced by AURAAA4002	E
AURC252327A	Identify, clarify and resolve problems	Replaced by AURAFA2004	NE
AURC270421A	Establish relations with customers	Replaced by AURACA2001	E
AURC361101A	Adapt work processes to new technologies	Replaced by AURAKA3002	E
AURC362721A	Establish customer requirements of a complex nature	Replaced by AURACA3002	E
AURC362807A	Build customer relations	Replaced by AURACA3003	E
AURC363337A	Maintain business image	Replaced by AURAMA3004	E

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AURC365722A	Estimate complex jobs	Replaced by AURATA3005	E
AURC463238B	Manage complex customer issues	Replaced by AURAMA4005	E
AURC465349B	Prepare a vehicle repair quotation	Replaced by AURANN4001	E
AURC561614A	Contribute to business improvement	Replaced by AURAMA5006	E
AURE218670A	Service, maintain or replace batteries	Replaced by AURETR2015	NE
AURE218708A	Carry out repairs to single electrical circuits	Replaced by AURETR2012	NE
AURE220140A	Manufacture and repair wiring harness/looms	Replaced by AURETR2010	NE
AURE311666A	Repair electric braking systems	Replaced by AURETB3001	E
AURS238127A	Identify and select automotive parts and products	Replaced by AURSCA2001	E
AURS238150A	Present stock and sales area	Replaced by AURSCA2002	E
AURS241303A	Apply sales procedures	Replaced by AURSCA2003	E
AURS241608A	Carry out cash and/or credit/funds transfer transactions	Replaced by AURSCA2004	E
AURS241769A	Sell product(s)	Replaced by AURSCA2005	E
AURS241803A	Apply legal requirements relating to product sales	Replaced by AURSLA2001	E
AURS242621A	Promote products and services	Replaced by AURSCA2006	E
AURS252290A	Process customer complaints	Replaced by AURSAA2001	E
AURS338103A	Apply automotive parts interpretation	Replaced by	E

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	process	AURSBA3002	
AURT210170A	Inspect and service braking systems	Replaced by AURTTB2001	E
AURT216170A	Inspect and service suspension systems	Replaced by AURTTD2004	E
AURT217865A	Remove and refit wheel hubs and associated brake components	Replaced by AURTTJ2002	E
AURT365508A	Carry out vehicle safety/roadworthy inspection	Replaced by AURTTA3017	E
AURT577620A	Develop and document specifications and procedures	Replaced by AURAFA5007	E
AURT577727B	Estimate and calculate costs to repair, maintain or modify a vehicle	Replaced by AURTNA5001	E
AURV226965A	Remove and replace/fit protector mouldings, transfers and decals	Replaced by AURVTN2005	E
AURV230449A	Apply paint touch-up techniques	Replaced by AURVTP2007	E
AURV324866A	Repair fibreglass/composite material components	Replaced by AURVTS3004	E
AURV328366A	Repair chassis/frame and associated components	Replaced by AURTTY3001	E
AURV331423CA	Fabricate and install canvas products	Replaced by AURVTT3015	E
AURV331423DA	Fabricate and install frame structures	Replaced by AURVTT3016	E
AURV331423GA	Fabricate and install canopies and curtains	Replaced by AURVTT3019	E
AURV334031A	Install side windows	Replaced by AURVTG3011	E
AURV465116A	Determine vehicle damage and recommended repair procedures	Replaced by AURVTN4032	E
BSBWRK509A	Manage industrial relations	Replaced by BSBWRK510A	E

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MEM09003B	Prepare basic engineering drawing	Replaced by MEM09024A	NE
MEM09004B	Perform electrical/electronic detail drafting	Replaced by MEM09205A*	NE
MEM09010C	Create 3D models using computer aided design system	Replaced by MEM09210A*	NE
MEM09021B	Interpret and produce curved 3-dimensional shapes	Replaced by MEM09216A	NE
MEM09141A	Represent mechanical engineering designs	Replaced by MEM09157A	NE
MEM09142A	Represent mechatronic engineering designs	Replaced by MEM09158A	NE
MEM09151A	Apply computer aided modelling and data management techniques to mechanical engineering designs	Replaced by MEM09155A* (*MEM23004A*, *MEM23109A*)	NE
MEM09152A	Apply computer aided modelling and data management techniques to mechatronic engineering designs	Replaced by MEM09156A* (*MEM23004A*, *MEM23109A*, *MEM23111A*, *MEM23112A*)	NE
MEM14061A	Plan and design mechanical engineering projects	Replaced by MEM14085A* (*MEM23004A*, *MEM23109A*)	NE
MEM14062A	Plan and design mechatronic engineering projects	Replaced by MEM14086A* (*MEM23004A*, *MEM14090A*, *MEM23111A*, *MEM23112A*)	NE
MEM14063A	Plan and design manufacturing engineering projects	Replaced by MEM14087A* (*MEM23004A*, *MEM14090A*,	NE

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		MEM14089A, *MEM23063A*)	
MEM14064A	Plan and design maintenance engineering projects	Replaced by MEM14088A* (*MEM23004A*, *MEM14092A*)	NE
MEM14081A	Apply mechanical engineering fundamentals to support design and development of projects	Replaced by MEM14089A* (*MEM23004A*, *MEM23109A*)	NE
MEM14082A	Apply mechatronics fundamentals to support design and development of engineering projects	Replaced by MEM14090A* (*MEM23004A*, *MEM23111A*, *MEM23112A*)	NE
MEM22003A	Manage engineering resources	Replaced by MEM22012A	NE
MEM22004A	Manage engineering projects	Replaced by MEM22013A	NE
MEM22005A	Manage engineering operations	Replaced by MEM22014A* (*MEM23004A*, *MEM14091A*)	NE
MEM22006A	Source and estimate materials	Replaced by MEM22015A	NE
MEM22008A	Manage change and technical development	Replaced by MEM22017A	NE
MEM22009A	Manage technical sales and promotion	Replaced by MEM22018A	NE
MEM23002A	Apply calculus in engineering situations	Replaced by MEM23007A* (*MEM23004A)*	NE
MEM23051A	Apply basic electro and control scientific principles and techniques in mechanical and manufacturing engineering situations	Replaced by MEM23111A* and MEM23112A* (*MEM23004A*,	NE

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		MEM23006A)	
MEM23061A	Select and test mechanical engineering materials	Replaced by MEM23063A* (*MEM23004A, MEM23109A)*	NE
MEM23062A	Select and test mechatronic engineering materials	Replaced by MEM23064A* (*MEM23004A, MEM23109A)*	NE
MEM23071A	Select and apply mechanical engineering methods, processes and construction techniques	Replaced by MEM14089A* (*MEM23004A, MEM23109A)*	NE
MEM23072A	Select and apply mechatronic engineering methods, processes and construction techniques	Replaced by MEM14090A* (*MEM23004A, MEM23109A, MEM23111A, MEM23112A)*	NE
MEM23081A	Apply scientific principles and techniques in mechanical engineering situations	Replaced by MEM23113A*, MEM23114A*, MEM23115A* (*MEM23004A, MEM23006A)*	NE
MEM23082A	Apply scientific principles and techniques in mechatronic engineering situations	Replaced by MEM23116A* and MEM23117A* (*MEM23004A, MEM23111A, MEM23112A)*	NE
MEM23083A	Apply industrial engineering principles and techniques in competitive manufacturing engineering situations	Replaced by MEM23118A* and MEM23119A* (*MEM30012A, MEM23118A)*	NE
MEM23091A	Apply mechanical system design principles and techniques in mechanical	Replaced by MEM23120* and	NE

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	engineering situations	MEM23121A* (*MEM23004A, MEM23109A, MEM23007A)*	
MEM23092A	Apply automated systems principles and techniques in engineering situations	Replaced by MEM23122A* (*MEM23004A, MEM23111A, MEM23112A)*	NE
MEM23093A	Apply plant and process design principles and techniques in engineering situations	Replaced by MEM23123A	NE
MEM23094A	Apply maintenance systems principles and techniques in engineering situations	Replaced by MEM23124A* and MEM23125A* (*MEM23004A, MEM14092A, MEM14088A)*	NE
MEM30001A	Use computer aided drafting systems to produce basic engineering drawings	Replaced by MEM30031A	NE
MEM30002A	Produce basic engineering graphics	Replaced by MEM30032A	NE
MEM30003A	Produce detailed engineering drawings	Covered by MEM30032A	NE
MEM30004A	Use CAD to create and display 3D models	Replaced by MEM30033A* *(MEM3001A)*	NE

Mapping MSA07v8.3

Updated qualifications

Code	**Title**	**Comment** ***Note** All qualifications remain equivalent*
MSA10107	Certificate I in Manufacturing	Release 2 - LMF units updated to

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	(Pathways)	MSF units
MSA20107	Certificate II in Process Manufacturing	Release 4 - imported elective unit updated to current release.
MSA20510	Certificate II in Recreational Vehicle Service and Repair	Release 5 - imported elective unit updated to current release.
MSA20610	Certificate II in Recreational Vehicle Manufacture	Release 5 - imported elective unit updated to current release
MSA30107	Certificate III in Process Manufacturing	Release 5 - imported elective unit updated to current release.
MSA30510	Certificate III in Recreational Vehicle Service and Repair	Release 5 - Imported elective unit updated to current release
MSA30610	Certificate III in Recreational Vehicle Manufacture	Release 5 - Imported elective unit updated to current release
MSA30710	Certificate III in Recreational Vehicle and Accessories Retailing	Release 5 - imported elective unit updated to current release
MSA40311	Certificate IV in Process Manufacturing	Release 4 - Imported elective unit updated to current release.
MSA40510	Certificate IV in Recreational Vehicles	Release 5 - Imported elective unit updated to current release
MSA40710	Certificate IV in Recreational Vehicle and Accessories Retailing	Release 5 - imported elective unit updated to current release
MSA50311	Diploma of Production Management	Release 4 - correction to metadata to show PMAOPS500A as available in this qualification
MSA50510	Diploma of Recreational Vehicles	Release 5 - imported elective unit updated to current release.
MSA60108	Advanced Diploma of Manufacturing Technology	Release 5 - unit codes corrected in Group B: • MEM14091A Integrate manufacturing fundamentals into an engineering task • MEM14092A Integrate maintenance fundamentals into an engineering task

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Updated MSA units of competency

Code	Title	Comment
MSAPMWJ201A	Use high pressure water jetting equipment	Release 2 - upgrade to incorporate changes to Australian Standard
MSAPMWJ301A	Operate a high pressure water jetting system	Release 2 - upgrade to incorporate changes to Australian Standard

Updated Imported units of competency

MSA07v8.2		MSA07v8.3		Comments
Code	**Title**	**Code**	**Title**	
AUMANA3001	Prepare and document quotation	AUMANA001	Prepare and document quotations	Release 1 - Equivalent to previous release
AUMFTA3001	Document designs	AUMFTA001	Document manufacturing design processes	Release 1 - Equivalent to previous release
AUMGTT2001	Apply trim to components	AUMGTT001	Apply trim to vehicle components	Release 1 - Equivalent to previous release
FPICOT2206B/ FPICOT2206A	Cross cut materials with a hand-held chainsaw	FPICOT2238A	Cut materials with a hand-held chainsaw	Release 2 - Equivalent
LMFFM1002B	Operate basic woodworking machines	MSFFM1002	Operate basic woodworking machines	Release 1 - Equivalent
LMFFM2001B	Use furniture making sector hand and power tools	MSFFM2001	Use furniture making sector hand and power tools	Release 1 - Equivalent
LMFFM2002B	Assemble furnishing components	MSFFM2002	Assemble furnishing components	Release 1 - Equivalent

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LMFFM2003B	Select and apply hardware	MSFFM2003	Select and apply hardware	Release 1 - Equivalent
LMFFM2005B	Join solid timber	MSFFM2005	Join solid timber	Release 1 - Equivalent
LMFSF1001B	Produce basic soft furnishing accessories	MSFSF1001	Produce basic soft furnishing accessories	Release 1 - Equivalent
LMFSF2001B	Cut single layer fabrics	MSFSF2001	Cut single layer fabrics	Release 1 - Equivalent

Units not carried forward

Code	Title	Comment
AUMANA3001	Prepare and document quotation	Replaced by AUMANA001
AUMFTA3001	Document designs	Replaced by AUMFTA001
AUMGTT2001	Apply trim to components	Replaced by AUMGTT001
FPICOT2206A	Cross cut materials with a hand-held chainsaw	Replaced by FPICOT2238A
FPICOT2206B	Cross cut materials with a hand-held chainsaw	Replaced by FPICOT2238A
LMFFM1002B	Operate basic woodworking machines	Replaced by MSFFM1002
LMFFM2001B	Use furniture making sector hand and power tools	Replaced by MSFFM2001
LMFFM2002B	Assemble furnishing components	Replaced by MSFFM2002
LMFFM2003B	Select and apply hardware	Replaced by MSFFM2003
LMFFM2005B	Join solid timber	Replaced by MSFFM2005
LMFSF1001B	Produce basic soft furnishing accessories	Replaced by MSFSF1001
LMFSF2001B	Cut single layer fabrics	Replaced by MSFSF2001
MSACMC411A	Lead a competitive manufacturing team	Orphan unit - removed from MSA07

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Overview

What is a Training Package?

A Training Package is an integrated set of nationally endorsed competency standards, assessment guidelines and Australian Qualifications Framework (AQF) qualifications for a specific industry, industry sector or enterprise.

Each Training Package:

- provides a consistent and reliable set of components for training, recognising and assessing peoples skills, and may also have optional support materials
- enables nationally recognised qualifications to be awarded through direct assessment of workplace competencies
- encourages the development and delivery of flexible training which suits individual and industry requirements
- encourages learning and assessment in a work-related environment which leads to verifiable workplace outcomes.

How do Training Packages fit within the National Skills Framework?

The National Skills Framework applies nationally, is endorsed by the Ministerial Council for Vocational and Technical Education, and comprises the Australian Quality Training Framework 2010 (AQTF 2010), and Training Packages endorsed by the National Quality Council (NQC).

How are Training Packages developed?

Training Packages are developed by Industry Skills Councils or enterprises to meet the identified training needs of specific industries or industry sectors. To gain national endorsement of Training Packages, developers must provide evidence of extensive research, consultation and support within the industry area or enterprise.

How do Training Packages encourage flexibility?

Training Packages describe the skills and knowledge needed to perform effectively in the workplace without prescribing how people should be trained.

Training Packages acknowledge that people can achieve vocational competency in many ways by emphasising what the learner can do, not how or where they learned to do it. For example, some experienced workers might be able to demonstrate competency against the units of competency, and even gain a qualification, without completing a formal training program.

With Training Packages, assessment and training may be conducted at the workplace, off-the-job, at a training organisation, during regular work, or through work experience, work placement, work simulation or any combination of these.

Who can deliver and assess using Training Packages?

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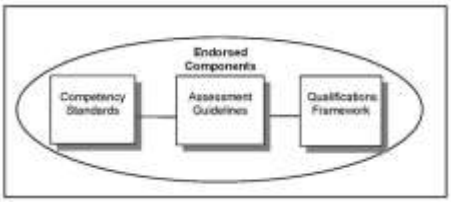
Training and assessment using Training Packages must be conducted by a Registered Training Organisation (RTO) that has the qualifications or specific units of competency on its scope of registration, or that works in partnership with another RTO, as specified in the AQTF 2010.

Training Package Components

Training Packages are made up of mandatory components endorsed by the NQC, and optional support materials.

Training Package Endorsed Components

The nationally endorsed components include the Competency Standards, Assessment Guidelines and Qualifications Framework. These form the basis of training and assessment in the Training Package and, as such, they must be used.



Competency Standards

Each unit of competency identifies a discrete workplace requirement and includes the knowledge and skills that underpin competency as well as language, literacy and numeracy; and occupational health and safety requirements. The units of competency must be adhered to in training and assessment to ensure consistency of outcomes.

Assessment Guidelines

The Assessment Guidelines provide an industry framework to ensure all assessments meet industry needs and nationally agreed standards as expressed in the Training Package and the AQTF 2010. The Assessment Guidelines must be followed to ensure the integrity of assessment leading to nationally recognised qualifications.

Qualifications Framework

Each Training Package provides details of those units of competency that must be achieved to award AQF qualifications. The rules around which units of competency can be combined to make up a valid AQF qualification in the Training Package are referred to as the ‘packaging rules’. The packaging rules must be followed to ensure the integrity of nationally recognised qualifications issued.

Training Package Support Materials

The endorsed components of Training Packages are complemented and supported by optional support materials that provide for choice in the design of training and assessment to meet the needs of industry and learners.

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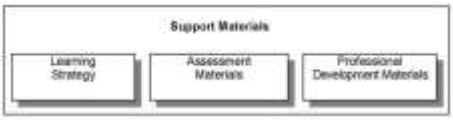
Training Package support materials can relate to single or multiple units of competency, an industry sector, a qualification or the whole Training Package. They tend to fall into one or more of the categories illustrated below.



Training Package support materials are produced by a range of stakeholders such as RTOs, individual trainers and assessors, private and commercial developers and Government agencies.

Training Package, Qualification and Unit of Competency Codes

There are agreed conventions for the national codes used for Training Packages and their components. Always use the correct codes, exactly as they appear in the Training Package, **and with the code always before the title**.

Training Package Codes

Each Training Package has a unique five-character national code assigned when the Training Package is endorsed, for example XYZ08. The first three characters are letters identifying the Training Package industry coverage and the last two characters are numbers identifying the year of endorsement.

Qualification Codes

Within each Training Package, each qualification has a unique eight-character code, for example XYZ10108. Qualification codes are developed as follows:

- the first three letters identify the Training Package;
- the first number identifies the qualification level (noting that, in the qualification titles themselves, arabic numbers are **not** used);
- the next two numbers identify the position in the sequence of the qualification at that level; and
- the last two numbers identify the year in which the qualification was endorsed. (Where qualifications are added after the initial Training Package endorsement, the last two numbers may differ from other Training Package qualifications as they identify the year in which those particular qualifications were endorsed.)

Unit of Competency Codes

Within each Training Package, each unit of competency has a unique code. Unit of competency codes are assigned when the Training Package is endorsed, or when new units of competency are added to an existing endorsed Training Package. Unit codes are developed as follows:

- a typical code is made up of 12 characters, normally a mixture of uppercase letters and numbers, as in MSACMC210A:
- the first three characters signify the Training Package – MSA07 – in the above example and up to eight characters, relating to an industry sector, function or skill area, follow;

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- the last character is always a letter and identifies the unit of competency version. An 'A' at the end of the code indicates that this is the original unit of competency. 'B', or another incremented version identifier means that minor changes have been made. Typically this would mean that wording has changed in the range statement or evidence guide, providing clearer intent; and
- where changes are made that alter the outcome, a new code is assigned and the title is changed.

Training Package, Qualification and Unit of Competency Titles

There are agreed conventions for titling Training Packages and their components. Always use the correct titles, exactly as they appear in the Training Package, and with the code always placed before the title.

Training Package Titles

The title of each endorsed Training Package is unique and relates the Training Packages broad industry coverage.

Qualification Titles

The title of each endorsed Training Package qualification is unique. Qualification titles use the following sequence:

- first, the qualification is identified as either Certificate I, Certificate II, Certificate III, Certificate IV, Diploma, Advanced Diploma, Vocational Graduate Certificate, or Vocational Graduate Diploma;
- this is followed by the words 'in' for Certificates I to IV, and 'of' for Diploma, Advanced Diploma, Vocational Graduate Certificate and Vocational Graduate Diploma;
- then, the industry descriptor, for example Telecommunications; and
- then, if applicable, the occupational or functional stream in brackets, for example (Computer Systems).

For example: MSA10107 Certificate I in Manufacturing (Pathways)

Unit of Competency Titles

Each unit of competency title is unique. Unit of competency titles describe the competency outcome concisely, and are written in sentence case.

For example: MSACMC210A Manage the impact of change on own work

Introduction to the Manufacturing Training Package (MSA07) Training Package

This Training Package has been developed as a significant step in the process of Training Package rationalisation work being undertaken by Manufacturing Skills Australia. There was an identified need for a 'whole of manufacturing' approach to many of the qualifications and units of competency contained in some of the manufacturing sector Training Packages.

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Version 1

Certificate I in Manufacturing (Pathways)

The first qualification and units of competency to populate this new Training Package was the MSA10107 Certificate 1 in Manufacturing (Pathways). This will be followed closely by more units of competency and qualifications that will be applicable across all of manufacturing.

Refer to the Appendices attached to this Training Package for information on development of this certificate.

Version 2

Process Manufacturing Certificates

The process manufacturing certificates have been developed for use by the industry sectors covered by the following Training Packages:

- PMA02 Chemical, Hydrocarbons and Oil Refining Training Package
- PMB07 Plastics, Rubber and Cablemaking Training Package
- PMC04 Manufactured Mineral Products Training Package.

In the recently completed review of the Plastics, Rubber and Cablemaking Training Package it was determined that the production support certificates in PMA, PMB and PMC should be rationalised to increase flexibility and recognition across all of process manufacturing.

In keeping with the high market penetration of the Certificates in Process Manufacturing in PMB01, this title has been maintained for the common certificates. The certificates have been generalised and recoded for inclusion on MSA07 and as such, will be available across all of process manufacturing. This makes the elective units from PMA, PMB and PMC all available for selection in a Certificate in Process Manufacturing.

Other generic units

In addition to the generic support units developed for the Process Manufacturing Certificates, it has been recognised that there would be significant benefits to be gained from rationalising other units in PMA, PMB and PMC. A range of units have been developed for inclusion in MSA07, not aligned to any MSA qualifications at this time. These units are intended to be used as imported electives in the Certificates IV, Diplomas and Advanced Diplomas in PMA, PMB and PMC.

Refer to the Appendices for more details on development of the above certificates.

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Version 3

MCM04 qualifications, new specialist streams for Technology Cadetship qualifications

Relocation of the MCM units and qualifications to MSA07 is the first step in a major rationalisation plan which will eventually see all the units and qualifications from the nine manufacturing Training Packages under the one framework. The changes are summarised below.

- The Competitive Manufacturing and Manufacturing Technology qualifications and units of competency have been recoded as MSA units and qualifications.
- The Competitive Manufacturing qualifications have been revised to incorporate units of competency covering sustainability skills and to include Employability Skills Summaries.
- All existing MCM units have been updated to replace Key Competencies with Employability Skills.

The MSAPMPER units and one MSAPMOHS unit have been revised as part of the current review of the Chemical, Hydrocarbons & Oil Refining Training Package.

- MSA07v2 qualifications (MSA10107, MSA10207, MSA20107 and MSA30107) updated with recoded MCM units, revised MSAPMPER units and updated LMT and LMF units.
- Addition of new metallurgy and polymer streams for the existing Certificate III in Manufacturing Technology.
- Addition of new polymer stream for the existing Certificate IV in Manufacturing Technology.
- Addition of Diploma and Advanced Diploma of Manufacturing Technology (metallurgy and polymer streams).

Full details on development of the Competitive Manufacturing qualifications and the new streams are included in the Appendices.

Version 3.1

New specialist stream for structural steel detailing in Technology Cadetship qualifications.

Six new units of competency for structural detailing and additional imported units have been added to the Manufacturing Technology qualifications to facilitate training of new entrants to this industry. Details of this development are included in the Appendices.

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Version 4

Competitive Manufacturing Vocational Graduate qualifications

The need for development of Vocational Graduate qualifications in Competitive Manufacturing was identified by MSA in 2007 in response to requests for more in depth training and professional development for individuals who already had some skills or training in Competitive Manufacturing practices.

The following new qualifications are included in MSA07v4:

- MSA71109 Vocational Graduate Certificate in Competitive Manufacturing
- MSA81109 Vocational Graduate Diploma of Competitive Manufacturing

More information on this development is included in the Appendices.

Version 5

Certificate III in Surface Preparation and Coating Application

The surface preparation and protective coating application industry sector approached Manufacturing Skills Australia (MSA) in 2008 regarding the lack of a qualification for people working in this sector. MSA, the national Industry Skills Council with coverage of this area, responded to this concern by establishing a project in 2008 to 'research existing units and develop units of competency to cover blast cleaning and coating'.

This research project identified a significant number of relevant units of competency and the need for at least one new unit of competency to cover the skill needs of this sector. As a result of this research, it also became clear that to fully respond to the industry's need, a new qualification was required, utilising existing units in MEM05 and PMB07 and the proposed new unit(s).

Further research and consultation with the industry, the industry association and relevant RTOs identified that the appropriate level of qualification was AQF 3. MSA supported the findings and contracted Kevin Hummel, Total Training and Performance Solutions to develop the new units and packaging rules for a new Certificate III in Surface Preparation and Coating Application.

More information on this development is included in the Appendices.

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Trade Measurement units and Skill Sets

In 2008, Manufacturing Skills Australia (MSA) contracted Ivan Johnstone, CIT Solutions, to undertake a scoping project to determine the scope of change required to update the Laboratory Operations Training Package (PML04). It was identified in that scoping project that because of changes to the regulatory environment for Australia's trade measurement system, there was a need to update/redevelop existing units of competency in MEM05 and/or develop new units to meet the needs of the National Measurement Institute (NMI).

- NMI is a Division of the Commonwealth Department of Innovation, Industry, Science and Research. The Institute is responsible for Australia's units and standards of measurement through the development and maintenance of standards of measurement, reference materials and reference techniques. The Institute has a wide variety of professional and technical staff who provide calibration, measurement, analysis, pattern approval testing and training services.

More information on this development is included in the Appendices.

Version 6

Recreational Vehicle qualifications

The recreational vehicle qualifications started with THC99 under the Tourism and Hospitality National Industry Training Advisory Board. This was revised to THC04 with minimal changes. With the merger of national ITABs into the ten Industry Skills Councils, THC04 came under the jurisdiction of the Service Industries Skills Councils. As the bulk of the use of these qualifications was in the fields of manufacture, service and repairs, it was realised that the recreational vehicle industry would be better served by bringing its qualifications under the coverage of the Manufacturing Industry Skills Council (Manufacturing Skills Australia – MSA). They have revised the qualifications and their associated units of competency and brought them into line with the current requirements and aligned them with similar manufacturing, service and repair qualifications.

This sector typically manufacture, repair and service recreational vehicles as required. Recreational vehicles include:

- motor homes
- caravans
- camper trailers
- slide-ons, and
- fifth wheelers

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Recreational vehicles may be made from a frame (timber, aluminium or steel) and skin (aluminium or fibre composite) or a manufactured wall panel or some other technology. They are typically mounted on a steel chassis. Fittings are typically timber/particle board but may be any other suitable material.

More information on this development is included in the appendices.

Historical and General Information

Introduction to the Manufacturing Training Package (MSA07) Training Package

This Training Package has been developed as a significant step in the process of Training Package rationalisation work being undertaken by Manufacturing Skills Australia. There was an identified need for a 'whole of manufacturing' approach to many of the qualifications and units of competency contained in some of the manufacturing sector Training Packages.

Version 1

Certificate I in Manufacturing (Pathways)

The first qualification and units of competency to populate this new Training Package was the MSA10107 Certificate 1 in Manufacturing (Pathways). This will be followed closely by more units of competency and qualifications that will be applicable across all of manufacturing.

Refer to the Appendices attached to this Training Package for information on development of this certificate.

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Process Manufacturing Certificates

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In the recently completed review of the Plastics, Rubber and Cablemaking Training Package it was determined that the production support certificates in PMA, PMB and PMC should be rationalised to increase flexibility and recognition across all of process manufacturing.

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In keeping with the high market penetration of the Certificates in Process Manufacturing in PMB01, this title has been maintained for the common certificates. The certificates have been generalised and recoded for inclusion on MSA07 and as such, will be available across all of process manufacturing. This makes the elective units from PMA, PMB and PMC all available for selection in a Certificate in Process Manufacturing.

Other generic units

In addition to the generic support units developed for the Process Manufacturing Certificates, it has been recognised that there would be significant benefits to be gained from rationalising other units in PMA, PMB and PMC. A range of units have been developed for inclusion in MSA07, not aligned to any MSA qualifications at this time. These units are intended to be used as imported electives in the Certificates IV, Diplomas and Advanced Diplomas in PMA, PMB and PMC.

Refer to the Appendices for more details on development of the above certificates.

Version 3

MCM04 qualifications, new specialist streams for Technology Cadetship qualifications

Relocation of the MCM units and qualifications to MSA07 is the first step in a major rationalisation plan which will eventually see all the units and qualifications from the nine manufacturing Training Packages under the one framework. The changes are summarised below.

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- The MSAPMPER units and one MSAPMOHS unit have been revised as part of the current review of the Chemical, Hydrocarbons & Oil Refining Training Package.
- MSA07v2 qualifications (MSA10107, MSA10207, MSA20107 and MSA30107) updated with recoded MCM units, revised MSAPMPER units and updated LMT and LMF units.
- Addition of new metallurgy and polymer streams for the existing Certificate III in Manufacturing Technology.
- Addition of new polymer stream for the existing Certificate IV in Manufacturing Technology.
- Addition of Diploma and Advanced Diploma of Manufacturing Technology (metallurgy and polymer streams).

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Version 4

Competitive Manufacturing Vocational Graduate qualifications

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The following new qualifications are included in MSA07v4:

- MSA71109 Vocational Graduate Certificate in Competitive Manufacturing
- MSA81109 Vocational Graduate Diploma of Competitive Manufacturing

More information on this development is included in the Appendices.

Version 5

Certificate III in Surface Preparation and Coating Application

The surface preparation and protective coating application industry sector approached Manufacturing Skills Australia (MSA) in 2008 regarding the lack of a qualification for people working in this sector. MSA, the national Industry Skills Council with coverage of this area, responded to this concern by establishing a project in 2008 to ‘research existing units and develop units of competency to cover blast cleaning and coating’.

This research project identified a significant number of relevant units of competency and the need for at least one new unit of competency to cover the skill needs of this sector. As a result of this research, it also became clear that to fully respond to the industry’s need, a new qualification was required, utilising existing units in MEM05 and PMB07 and the proposed new unit(s).

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Further research and consultation with the industry, the industry association and relevant RTOs identified that the appropriate level of qualification was AQF 3. MSA supported the findings and contracted Kevin Hummel, Total Training and Performance Solutions to develop the new units and packaging rules for a new Certificate III in Surface Preparation and Coating Application.

More information on this development is included in the Appendices.

Trade Measurement units and Skill Sets

In 2008, Manufacturing Skills Australia (MSA) contracted Ivan Johnstone, CIT Solutions, to undertake a scoping project to determine the scope of change required to update the Laboratory Operations Training Package (PML04). It was identified in that scoping project that because of changes to the regulatory environment for Australia's trade measurement system, there was a need to update/redevelop existing units of competency in MEM05 and/or develop new units to meet the needs of the National Measurement Institute (NMI).

- NMI is a Division of the Commonwealth Department of Innovation, Industry, Science and Research. The Institute is responsible for Australia's units and standards of measurement through the development and maintenance of standards of measurement, reference materials and reference techniques. The Institute has a wide variety of professional and technical staff who provide calibration, measurement, analysis, pattern approval testing and training services.

More information on this development is included in the Appendices.

Version 6

Recreational Vehicle qualifications

The recreational vehicle qualifications started with THC99 under the Tourism and Hospitality National Industry Training Advisory Board. This was revised to THC04 with minimal changes. With the merger of national ITABs into the ten Industry Skills Councils, THC04 came under the jurisdiction of the Service Industries Skills Councils. As the bulk of the use of these qualifications was in the fields of manufacture, service and repairs, it was realised that the recreational vehicle industry would be better served by bringing its qualifications under the coverage of the Manufacturing Industry Skills Council (Manufacturing Skills Australia – MSA). They have revised the qualifications and their associated units of competency and brought them into line with the current requirements and aligned them with similar manufacturing, service and repair qualifications.

This sector typically manufacture, repair and service recreational vehicles as required. Recreational vehicles include:

- motor homes

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- caravans
- camper trailers
- slide-ons, and
- fifth wheelers

Recreational vehicles may be made from a frame (timber, aluminium or steel) and skin (aluminium or fibre composite) or a manufactured wall panel or some other technology. They are typically mounted on a steel chassis. Fittings are typically timber/particle board but may be any other suitable material.

More information on this development is included in the appendices.

Version 7

Process manufacturing

The Certificate 1 to Certificate III in Process Manufacturing exist as generalist manufacturing qualifications which include technical units, but do not require any minimum number of them.

When Total Training and Performance Solutions (TaPS) undertook the Manufactured Mineral Products Training Package update project in 2009, a report was made to Manufacturing Skills Australia (MSA) suggesting the extension of the generic Certificates in Process Manufacturing to Certificate IV and Diploma level. This need was coincidentally confirmed by a hydrocarbons company in the same timeframe.

The identified need was to provide qualifications for a career path for those who already hold the Certificate III in Process Manufacturing, and also to provide qualifications to support a non-technical career path for others with technical Certificates III (or IV). While it might be argued that the Competitive Manufacturing, or the FrontLine Management qualifications already provide that, they are not seen as providing the same flexible mix of industry units as the generic Process Manufacturing qualifications which are truncated at the Certificate III because of the history of their development.

MSA supported the findings and contracted TaPS to develop the new qualifications.

Industry drivers for change

The major industry drivers for the improvements to this package are outlined below:

- Currently the Certificates I – III in Process Manufacturing exist as generalist manufacturing qualifications which include technical units, but do not require any minimum number of them. It was seen as desirous to extend these qualifications to provide a career path for those who already hold the Certificate III in Process Manufacturing.
- It was also seen as advantageous to provide qualifications to support a non-technical career path for those with technical Certificates III (or IV).

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Version 8

Components for endorsement:

- Two (2) new high risk work licensing boiler operation units of competency.

The new units of competency will not be aligned to any qualifications, but will be available for use in Skill Sets and for importation into other Training Package qualifications as required.

Project background

The development of the two new units of competency follows on from Safe Work Australia's Strategic Issues Group on Occupational Health and Safety (SIG-OHS) and the review process conducted through the licensing Temporary Advisory Group (TAG). The agreement from this process resulted in the current three licensing categories for boiler operation, standard, intermediate and advanced boilers being replaced by a two tier licensing system for standard and advanced boilers. The new licensing categories need to be underpinned by endorsed units of competency specifically designed to meet regulatory requirements for skills and knowledge and a unit format compatible with other high risk work licensing units of competency already endorsed in the CPC08 Construction, Plumbing and Services, TLI10 Transport and Logistics and other national Training Packages.

The new units of competency will be supported by mandatory Assessment Instructions and Resource Requirements documentation agreed by national regulators and achievement of competency against the units will meet the educational requirements for licensing in each category.

The new licensing units of competency are not attached to any MSA qualification but can be imported to any Training Package as required. The new units will also be available as Skill Sets to allow for training and assessment to occur to support the competency requirements for licensing of boiler operations.

History

The Manufacturing Training Package (MSA07) has been developed as part of the rationalisation work being undertaken by Manufacturing Skills Australia.

Version 1

MSA07v1 contained the Certificate I in Manufacturing (Pathways).

Version 2

MSA07v2 was expanded to include the newly developed Certificates I, II and III in Process Manufacturing which are for use across the three process manufacturing sectors covered by PMA, PMB and PMC Training Packages.

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Also included in Version 2 were the following units of competency that are available for importation to Certificates IV, Diplomas and Advanced Diplomas in PMA, PMB and PMC:

- MSAENV472A Implement and monitor environmentally sustainable work practices
- MSAENV672A Develop workplace policy and procedures for sustainability
- MSAPMOHS400A Contribute to OHS management system
- MSAPMOHS401A Assess risk
- MSAPMOHS503A Maintain the workplace OHS management system
- MSAPMOHS510A Manage risk
- MSAPMOHS601A Establish workplace OHS management system
- MSAPMOPS400A Optimise process/plant area
- MSAPMOPS401A Trial new process or product
- MSAPMOPS404A Co-ordinate maintenance
- MSAPMOPS405A Identify problems in fluid power system
- MSAPMOPS406A Identify problems in electronic control systems
- MSAPMSUP400A Develop and monitor quality systems

In Version 2, the PMB and process manufacturing units in MSA10107 Certificate I in Manufacturing (Pathways) were updated and recoded. Refer to Mapping of units for details.

Three environmental sustainability units have been developed by Manufacturing Skills Australia. They were included in the Process Manufacturing production support certificates and will be made available across all manufacturing Training Packages. The units are:

- MSAENV272A Participate in environmentally sustainable work practices
- MSAENV472A Implement and monitor environmentally sustainable work practices
- MSAENV672A Develop workplace policy and procedures for sustainability.

In version 3 (see below) these three units have been incorporated into the Competitive Manufacturing qualifications.

Version 3

Following are details of changes to MSA07v2:

- inclusion of the current Competitive Manufacturing and Manufacturing Technology qualifications and units of competency
- variation to existing Competitive Manufacturing qualifications to incorporate the three new units of competency covering sustainability skills and to include Employability Skills Summaries
- updating of existing MCM units to replace Key Competencies with Employability Skills
- updating of the MSAPMPER units and one MSAPMOHS unit which have been revised as part of the current review of the Chemical, Hydrocarbons & Oil Refining Training Package

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- MSA07v2 qualifications (MSA10107, MSA10207, MSA20107 and MSA30107) updated with recoded MCM units, revised MSAPMPER units and updated LMT and LMF units.
- addition of new metallurgy and polymer pathways for the existing Certificate III in Manufacturing Technology
- addition of new polymer pathway for the existing Certificate IV in Manufacturing Technology
- addition of Diploma and Advanced Diploma of Manufacturing Technology (metallurgy and polymer pathways)

Version 3.1

- Version 3.1 includes six new MSA Technology Cadetship units and 10 additional MEM units as electives for a new structural steel detailing stream in MSA30208 Certificate III in Manufacturing Technology and MSA50108 Diploma of Manufacturing Technology.
- Miscellaneous typographical errors related to unit codes have been corrected in the unit tables in the following qualifications: MSA10107, MSA20107, MSA20208, MSA30208, MSA40108, MSA50108 and MSA60108.
- PMBPREP508A has been removed from the Manufacturing Technology elective bank in MSA50108 as it duplicates MEM09003B.

Version 4

Inclusion of two new Competitive Manufacturing Vocational Graduate qualifications and the following new units:

MSACMG700A	Review continuous improvement processes
MSACMG701A	Prepare for and implement change
MSACMG702A	Review manufacturing practice tools and techniques
MSACMG703A	Analyse process changes
MSACMG704A	Facilitate improvements in the value chain
MSACMG705A	Undertake a qualitative review of a process change
MSACMG706A	Build relationships between teams in a manufacturing environment
MSACMG707A	Respond to a major non-conformance
MSACMG708A	Capture learning from daily activities in a manufacturing organisation
MSACMG709A	Facilitate improvements in the external value chain

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MSACMG710A	Improve visual management in the workplace
MSACMG711A	Manage benchmarking studies
MSACMG712A	Lead a problem solving process to determine and solve root cause
MSACMG800A	Analyse data for relevance to organisational learning
MSACMG801A	Develop the competitive manufacturing approach
MSACMG802A	Audit the use of competitive tools
MSACMG803A	Develop models of future state manufacturing practice
MSACMG804A	Develop the value chain
MSACMG805A	Develop the learning processes of the manufacturing organisation
MSACMG806A	Develop and refine systems for continuous improvement in manufacturing organisations
MSACMG807A	Develop problem solving capability of a manufacturing organisation

Version 5

New units of competency

Unit code	**Unit title**
MSAPMOPS201A	Cut polymer materials
MSAPMOPS202A	Fabricate polymer materials
MSAPMOPS301A	Treat corrosion
MSATMINS301A	Inspect a range of simple measures
MSATMINS302A	Inspect a range of simple measuring instruments

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MSATMINS401A	Inspect a range of weighing instruments
MSATMINS402A	Inspect a range of liquid measuring instruments using volume measures
MSATMINS403A	Inspect a range of trading practices
MSATMINS404A	Inspect a range of pre-packaged products
MSATMINS501A	Inspect a range of complex measuring instruments
MSATMREF301A	Use and maintain reference standards
MSATMVER301A	Verify simple measures
MSATMVER302A	Verify a simple measuring instruments
MSATMVER401A	Verify a limited weighing instrument
MSATMVER402A	Verify a liquid measuring instrument using volume measures
MSATMVER403A	Verify inspector’s class reference standards
MSATMVER501A	Verify a complex measuring instrument

Additional imported units

MEM07001B	Perform operational maintenance of machines/equipment
MEM08002C	Pre-treat work for subsequent surface coating
MEM08007B	Control surface finish production and finished product quality
MEM08011B	Prepare surfaces using solvents and/or mechanical means
MEM08012B	Prepare surfaces by abrasive blasting (basic)
MEM08013B	Prepare surfaces by abrasive blasting (advanced)
MEM08014B	Apply protective coatings (basic)
MEM08015B	Apply protective coatings (advanced)
MEM08016B	Control blast coating by-products, materials and emissions
MEM11001C	Erect/dismantle scaffolding and equipment

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MEM11002C	Erect/dismantle complex scaffolding and equipment
MEM11003B	Coordinate erection/dismantling of complex scaffolding/equipment
MEM11004B	Undertake dogging
MEM11010B	Operate mobile load shifting equipment
MEM11011B	Undertake manual handling
MEM11012B	Purchase materials
MEM11016B	Order materials
MEM11021B	Perform advanced operation of load shifting equipment
MEM11022B	Operate fixed/moveable load shifting equipment
MEM12001B	Use comparison and basic measuring devices
MEM13001B	Perform emergency first aid
MEM15002A	Apply quality systems
MEM15024A	Apply quality procedures
MEM16002C	Conduct formal interviews and negotiations
MEM16011A	Communicate with individuals and small groups
MEM16013A	Operate in a self directed team
MEM17001B	Assist in the development and delivery of training in the workplace
MEM17003A	Assist in the provision of on the job training
MNMG237A	Work safely at heights
PMBPROD241C	Lay up rubber lining or lag pulleys
PMBPROD242A	Bond polymers to surfaces
PMBPROD248C	Prepare surfaces for coating
PMBPROD265C	Operate portable vulcanising equipment
PMBPROD323C	Produce powder coated products
PMBPROD375B	Vulcanise products using an autoclave

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Version 6

Refer to summary mapping for details of changes to MSA07 and Recreational Vehicle qualifications and units of competency.

Version 7

Addition of two new qualifications:

- MSA40311 Certificate IV in Process Manufacturing
- MSA50311 Diploma of Production Management

Inclusion of 51 additional imported units.

Version 8

Two new units of competency

Unit code	Unit title
MSABLIC001	License to operate a standard boiler
MSABLIC002	License to operate an advanced boiler

Introduction to the Industry

The manufacturing industry

The manufacturing industry's contribution to Australia's gross domestic product (GDP) has been falling in percentage terms since the early 1960s as other industries have risen in prominence. Despite this it is still the second largest segment of the Australian economy. In 2005–06, the industry had a gross industry product of $96 billion, exports of $75 billion and employed 1,052,000 persons. Manufacturing is a major contributor to the state economies of South Australia, Victoria, Tasmania and New South Wales.

The scope of 'manufacturing' occupations covers a broad spectrum. The skills profile of the manufacturing industry covers production workers, tradespeople, technicians and associate professionals as well as professionals. These are applied in the range of manufacturing from simply transformed to elaborately transformed materials.

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Qualification Framework

The Australian Qualifications Framework

What is the Australian Qualifications Framework?

A brief overview of the Australian Qualifications Framework (AQF) follows. For a full explanation of the AQF, see the *AQF Implementation Handbook*.
http://www.aqf.edu.au/Portals/0/Documents/Handbook/AQF_Handbook_07.pdf

The AQF provides a comprehensive, nationally consistent framework for all qualifications in post-compulsory education and training in Australia. In the vocational education and training (VET) sector it assists national consistency for all trainees, learners, employers and providers by enabling national recognition of qualifications and Statements of Attainment.

Training Package qualifications in the VET sector must comply with the titles and guidelines of the AQF. Endorsed Training Packages provide a unique title for each AQF qualification which must always be reproduced accurately.

Qualifications

Training Packages can incorporate the following eight AQF qualifications.

- Certificate I in ...
- Certificate II in ...
- Certificate III in ...
- Certificate IV in ...
- Diploma of ...
- Advanced Diploma of ...
- Vocational Graduate Certificate of ...
- Vocational Graduate Diploma of ...

On completion of the requirements defined in the Training Package, a Registered Training Organisation (RTO) may issue a nationally recognised AQF qualification. Issuance of AQF qualifications must comply with the advice provided in the *AQF Implementation Handbook* and the AQTF 2010 *Essential Standards for Initial and Continuing Registration*.

Statement of Attainment

A Statement of Attainment is issued by a Registered Training Organisation when an individual has completed one or more units of competency from nationally recognised qualification(s)/courses(s). Issuance of Statements of Attainment must comply with the advice provided in the current *AQF Implementation Handbook* and the AQTF 2010 *Essential Standards for Initial and Continuing Registration*.

Under the AQTF 2010, RTOs must recognise the achievement of competencies as recorded on a qualification or Statement of Attainment issued by other RTOs. Given this, recognised competencies can progressively build towards a full AQF qualification.

AQF Guidelines and Learning Outcomes

The *AQF Implementation Handbook* provides a comprehensive guideline for each AQF qualification. A summary of the learning outcome characteristics and their distinguishing features for each VET related AQF qualification is provided below.

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Certificate I

Characteristics of Learning Outcomes

Breadth, depth and complexity of knowledge and skills would prepare a person to perform a defined range of activities most of which may be routine and predictable.

Applications may include a variety of employment related skills including preparatory access and participation skills, broad-based induction skills and/or specific workplace skills. They may also include participation in a team or work group.

Distinguishing Features of Learning Outcomes

Do the competencies enable an individual with this qualification to:

- demonstrate knowledge by recall in a narrow range of areas;
- demonstrate basic practical skills, such as the use of relevant tools;
- perform a sequence of routine tasks given clear direction

receive and pass on messages/information.

Certificate II

Characteristics of Learning Outcomes

Breadth, depth and complexity of knowledge and skills would prepare a person to perform in a range of varied activities or knowledge application where there is a clearly defined range of contexts in which the choice of actions required is usually clear and there is limited complexity in the range of operations to be applied.

Performance of a prescribed range of functions involving known routines and procedures and some accountability for the quality of outcomes.

Applications may include some complex or non-routine activities involving individual responsibility or autonomy and/or collaboration with others as part of a group or team.

Distinguishing Features of Learning Outcomes

Do the competencies enable an individual with this qualification to:

- demonstrate basic operational knowledge in a moderate range of areas;
- apply a defined range of skills;
- apply known solutions to a limited range of predictable problems;
- perform a range of tasks where choice between a limited range of options is required;
- assess and record information from varied sources;

take limited responsibility for own outputs in work and learning.

Certificate III

Characteristics of Learning Outcomes

Breadth, depth and complexity of knowledge and competencies would cover selecting, adapting and transferring skills and knowledge to new environments and providing technical advice and some leadership in resolution of specified problems. This would be applied across a range of roles in a variety of contexts with some complexity in the extent and choice of options available.

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Performance of a defined range of skilled operations, usually within a range of broader related activities involving known routines, methods and procedures, where some discretion and judgement is required in the section of equipment, services or contingency measures and within known time constraints.

Applications may involve some responsibility for others. Participation in teams including group or team co-ordination may be involved.

Distinguishing Features of Learning Outcomes

Do the competencies enable an individual with this qualification to:

- demonstrate some relevant theoretical knowledge
- apply a range of well-developed skills
- apply known solutions to a variety of predictable problems
- perform processes that require a range of well-developed skills where some discretion and judgement is required
- interpret available information, using discretion and judgement
- take responsibility for own outputs in work and learning

take limited responsibility for the output of others.

Certificate IV

Characteristics of Learning Outcomes

Breadth, depth and complexity of knowledge and competencies would cover a broad range of varied activities or application in a wider variety of contexts most of which are complex and non-routine. Leadership and guidance are involved when organising activities of self and others as well as contributing to technical solutions of a non-routine or contingency nature.

Performance of a broad range of skilled applications including the requirement to evaluate and analyse current practices, develop new criteria and procedures for performing current practices and provision of some leadership and guidance to others in the application and planning of the skills. Applications involve responsibility for, and limited organisation of, others.

Distinguishing Features of Learning Outcomes

Do the competencies enable an individual with this qualification to:

- demonstrate understanding of a broad knowledge base incorporating some theoretical concepts
- apply solutions to a defined range of unpredictable problems
- identify and apply skill and knowledge areas to a wide variety of contexts, with depth in some areas
- identify, analyse and evaluate information from a variety of sources
- take responsibility for own outputs in relation to specified quality standards

take limited responsibility for the quantity and quality of the output of others.

Diploma

Characteristics of Learning Outcomes

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Breadth, depth and complexity covering planning and initiation of alternative approaches to skills or knowledge applications across a broad range of technical and/or management requirements, evaluation and co-ordination.

The self directed application of knowledge and skills, with substantial depth in some areas where judgment is required in planning and selecting appropriate equipment, services and techniques for self and others.

Applications involve participation in development of strategic initiatives as well as personal responsibility and autonomy in performing complex technical operations or organising others. It may include participation in teams including teams concerned with planning and evaluation functions. Group or team co-ordination may be involved.

The degree of emphasis on breadth as against depth of knowledge and skills may vary between qualifications granted at this level.

Distinguishing Features of Learning Outcomes

Do the competencies or learning outcomes enable an individual with this qualification to:

- demonstrate understanding of a broad knowledge base incorporating theoretical concepts, with substantial depth in some areas
- analyse and plan approaches to technical problems or management requirements
- transfer and apply theoretical concepts and/or technical or creative skills to a range of situations
- evaluate information, using it to forecast for planning or research purposes
- take responsibility for own outputs in relation to broad quantity and quality parameters

take some responsibility for the achievement of group outcomes.

Advanced Diploma

Characteristics of Learning Outcomes

Breadth, depth and complexity involving analysis, design, planning, execution and evaluation across a range of technical and/or management functions including development of new criteria or applications or knowledge or procedures.

The application of a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts in relation to either varied or highly specific functions. Contribution to the development of a broad plan, budget or strategy is involved and accountability and responsibility for self and others in achieving the outcomes is involved.

Applications involve significant judgement in planning, design, technical or leadership/guidance functions related to products, services, operations or procedures.

The degree of emphasis on breadth as against depth of knowledge and skills may vary between qualifications granted at this level.

Distinguishing Features of Learning Outcomes

Do the competencies or learning outcomes enable an individual with this qualification to:

- demonstrate understanding of specialised knowledge with depth in some areas

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- analyse, diagnose, design and execute judgements across a broad range of technical or management functions
- generate ideas through the analysis of information and concepts at an abstract level
- demonstrate a command of wide-ranging, highly specialised technical, creative or conceptual skills
- demonstrate accountability for personal outputs within broad parameters

demonstrate accountability for personal and group outcomes within broad parameters.

Vocational Graduate Certificate

Characteristics of competencies or learning outcomes

- The self-directed development and achievement of broad and specialised areas of knowledge and skills, building on prior knowledge and skills.
- Substantial breadth and complexity involving the initiation, analysis, design, planning, execution and evaluation of technical and management functions in highly varied and highly specialised contexts.
- Applications involve making significant, high-level, independent judgements in major broad or planning, design, operational, technical and management functions in highly varied and specialised contexts. They may include responsibility and broad-ranging accountability for the structure, management and output of the work or functions of others.
- The degree of emphasis on breadth, as opposed to depth, of knowledge and skills may vary between qualifications granted at this level.

Distinguishing features of learning outcomes

- Demonstrate the self-directed development and achievement of broad and specialised areas of knowledge and skills, building on prior knowledge and skills.
- Initiate, analyse, design, plan, execute and evaluate major broad or technical and management functions in highly varied and highly specialised contexts.
- Generate and evaluate ideas through the analysis of information and concepts at an abstract level.
- Demonstrate a command of wide-ranging, highly specialised technical, creative or conceptual skills in complex contexts.
- Demonstrate responsibility and broad-ranging accountability for the structure, management and output of the work or functions of others.

Vocational Graduate Diploma

Characteristics of competencies or learning outcomes

- The self-directed development and achievement of broad and specialised areas of knowledge and skills, building on prior knowledge and skills.
- Substantial breadth, depth and complexity involving the initiation, analysis, design, planning, execution and evaluation of major functions, both broad and highly specialised, in highly varied and highly specialised contexts.
- Further specialisation within a systematic and coherent body of knowledge.

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- Applications involve making high-level, fully independent, complex judgements in broad planning, design, operational, technical and management functions in highly varied and highly specialised contexts. They may include full responsibility and accountability for all aspects of work and functions of others, including planning, budgeting and strategy development.
- The degree of emphasis on breadth, as opposed to depth, of knowledge and skills may vary between qualifications granted at this level.

Distinguishing features of learning outcomes

- Demonstrate the self-directed development and achievement of broad and highly specialised areas of knowledge and skills, building on prior knowledge and skills.
- Initiate, analyse, design, plan, execute and evaluate major functions, both broad and within highly varied and highly specialised contexts.
- Generate and evaluate complex ideas through the analysis of information and concepts at an abstract level.
- Demonstrate an expert command of wide-ranging, highly specialised, technical, creative or conceptual skills in complex and highly specialised or varied contexts.
- Demonstrate full responsibility and accountability for personal outputs.
- Demonstrate full responsibility and accountability for all aspects of the work or functions of others, including planning, budgeting and strategy.
-

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Qualification Pathways

Qualifications in MSA07

The new Manufacturing Training Package was initially developed to include all qualifications across the manufacturing industries as the existing manufacturing Training Packages are rationalised. Information on some of the qualifications available in MSA07 follows.

Pathways qualifications

MSA10107 Certificate I in Manufacturing (Pathways)

The Certificate I in Manufacturing (Pathways) is a cross-manufacturing certificate, utilising elective units from a range of MSA Training Packages. The packaging rules for MSA10107 are based on the agreed Pathways qualification model:

- three core Pathways units
- one industry/technical unit* to be chosen from a bank of units imported from MCM04
- balance of units from a bank of elective units imported from other MSA Training Packages.

***Note** that the industry/technical units coded "MSAPII" are designed for use only in a Pathways qualification or skills set. They should not be used in other qualifications as replacements for units that have direct job outcomes.

There is significant support from a range of manufacturing industries for the Pathways Certificate I. The certificate has been reviewed and approved by MSA's industry advisory committees, whose members represent:

- textiles, clothing, footwear and furniture
- process manufacturing
- metal and engineering.

The Certificate I in Manufacturing (Pathways) provides a generic, cross manufacturing Certificate I designed to:

- develop both employability and technical skills
- allow for selection of competency standards from a range of manufacturing Training Packages
- encourage collaborative delivery and assessment approaches\
- map to existing qualifications
- include opportunities for recognition against existing qualifications
- provide a clear pathway into other Training Package qualifications and/or employment.

The Pathways Certificate I also responds to the need to:

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- provide pathways for those whom access to formal vocational education and training has been limited
- ensure consistency with existing Certificate I qualifications
- ensure that employment related solutions are encouraged throughout the structure of the qualifications and that guideline materials provided are in alignment with licensing boundaries
- make employability and generic skills 'front and centre' in the development of qualifications
- provide opportunities for new pedagogical approaches and for local input.

It is expected that as manufacturing Training Packages are reviewed and/or updated, this certificate will replace a number of existing Certificates I.

MSA20208 Certificate II in Manufacturing Technology

This qualification was developed and endorsed in the Competitive Manufacturing Training Package. It applies to a learning and assessment environment where access to normal production operations is not available. A typical environment will be for application in a VET in Schools program or other simulated or trial manufacturing environment where a high degree of supervision exists. The units are suitable for delivery in a school environment and for schools to contextualize the units to local manufacturing industry activities.

Process Manufacturing qualifications

Process Manufacturing Certificates I, II, III and IV

The three Process Manufacturing Certificates (or production support certificates) cater for people working in the manufacturing industry and filling vital production support roles, but who may not have the opportunity to develop competence in sufficient technical units of competency related directly to producing products.

These certificates have been developed for inclusion in the Manufacturing Training Package (MSA07) as common certificates for use across the three process manufacturing Training Packages:

- Chemical, Hydrocarbons and Oil Refining Training Package (PMA)
- Plastics, Rubber and Cablemaking Training Package (PMB)
- Manufactured Mineral Products Training Package (PMC).

The packaging rules for these certificates allow for the importation of electives from PMA, PMB and PMC. Registered Training Organisations should refer to Training.gov.au (www.training.gov.au) to access units of competency from these packages.

Production Management qualifications

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Production Management Diploma

The Diploma of Production Management was developed to provide the skills needed to assist organisations improve production where competitive manufacturing (lean) processes are not fully employed. It therefore complements but does not duplicate qualifications supplying skills related to competitive manufacturing.

The qualification supplies the skills that can be applied to the design and control of production systems within an organisation, including:

- planning and scheduling
- tracking and analysing
- directing and operating.

Competitive Manufacturing qualifications

General Comments

The Competitive Manufacturing qualifications were developed as a collaborative response from Australia's manufacturing Industry Advisory Bodies to assist manufacturing industry improve manufacturing practice through the development of innovative vocational education and training (VET) qualifications and units of competency. Full details on this development are in the Appendices to MSA07.

As the Competitive Manufacturing qualifications complement manufacturing Training Packages, provision is made in the qualifications for the importation of relevant sector specific units of competency into CM qualifications. It is also expected that CM units of competency will be imported into existing manufacturing Training Packages when they are reviewed, or under continuous improvement provisions. Not all CM units of competency may be appropriate for any given sector.

Due to the nature of CM, it is expected that most delivery and assessment will be done in partnership with an enterprise, or group of enterprises, which are embarking on competitive manufacturing. A project style of delivery is envisaged for many units of competency.

It may be appropriate to grant recognition of prior learning (RPL) for certain FMI units depending on the amount and type of contextualisation applied to the FMI unit. As the equivalence will depend on the contextualisation applied, it is not possible to give general advice at this stage.

Companies embarking on competitive/lean manufacturing will frequently choose different starting points, and often different names to describe what they are doing. This Training Package allows for these differences in approach and relevant units of competency should be selected to match the starting point and the strategies being adopted.

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Where sector specific competencies are required, these should be imported from the relevant sector specific Training Package. Relevant units at the same level or at an AQF level one up or one below the selected CM qualification should be chosen.

Using the CM units

The CM units have been written with the intention that they be used in a number of contexts.

The units have been packaged into specific Competitive Manufacturing qualifications. These are appropriate for individuals and enterprises where the need for generic manufacturing practice skills is dominant over the need for specific technical skills. The requirements for Competitive Manufacturing qualifications are detailed in the packaging rules for each qualification.

The units are also intended to be imported into sector specific Training Packages and qualifications. This would be appropriate where the need for sector specific and/or technical skills is dominant, but there is also a need for generic manufacturing practice skills. The requirements for these sector specific qualifications will be contained in their respective Training Packages and Qualifications Frameworks.

It is expected that many personnel in manufacturing will have some need of the manufacturing practice skills defined by the Competitive Manufacturing units of competency. Their importation into manufacturing Training Packages is encouraged. Imported units should show the original code number and unit title.

Qualification Pathways for Competitive Manufacturing – AQF II to VI

The diagram below represents a model of the available qualifications and pathways. Details are in the packaging rules for each qualification. Contact Manufacturing Skills Australia {www.mskills.com.au} for further details.

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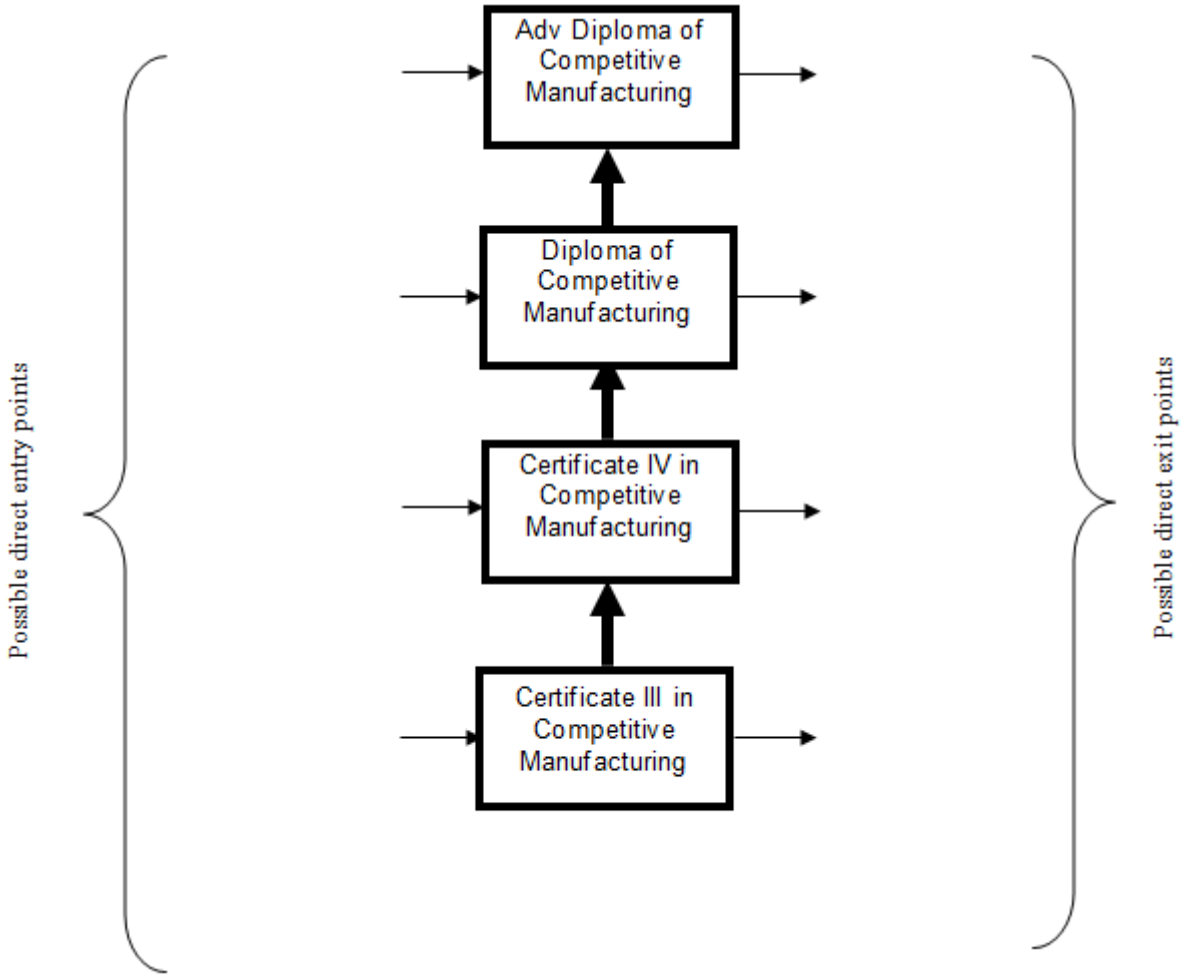

Competitive Manufacturing Vocational Graduate qualifications

The addition of these new qualifications will enable a professional development pathway to be offered for individuals who have prior experience or training in competitive manufacturing.

Industry priorities addressed in the new Vocational Graduate qualifications are to provide additional development of skills and knowledge in competitive manufacturing practices for individuals who have prior training or industry experience in competitive manufacturing. This need for additional skill is usually apparent after an enterprise has completed initial implementation of a competitive manufacturing system such as lean manufacturing and needs to progress implantation of the system to a higher level of performance beyond that achieved from the initial implementation.

Development of the Vocational Graduate Competitive Manufacturing qualifications is also a response to industry advice that not all needs for increased competency in competitive manufacturing skills is related to promotion of an individual to a position of increased responsibility. As stated in the previous paragraph the demand for increased skill and

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knowledge can also be related to the stage of an enterprise's implementation of a competitive manufacturing system

The Vocational Graduate Competitive Manufacturing qualifications also meet the industry need for in depth competitive manufacturing training in skills associated with establishing workforce understanding and participation in competitive manufacturing and for advanced value chain skills.

The new Vocational Graduate Competitive Manufacturing qualifications now offer a choice of two levels of professional development for individuals seeking to extend their knowledge of and skills in competitive manufacturing systems. Unlike the existing endorsed AQF II – VI Competitive Manufacturing qualifications they do not have assumptions that the candidate will be working at a particular level in industry (e.g. supervisor or manager). For this reason they are likely to be seen as ideal training for change agents and other expert resource people in competitive manufacturing as well as offering further skill development to any one with previous competitive manufacturing training or experience.

Consultations also indicated that the project based nature of many of the units and the lower but more intense nature of the qualifications may attract more senior and experienced personnel to the qualifications compared to the existing Diploma and Advanced Diploma of Competitive Manufacturing which are designed as high level entry level qualifications to competitive manufacturing.

Manufacturing Technology Qualifications

In August 2003 the Australian Industry Group with funding assistance from ANTA established a Manufacturing Technician Training Initiative project known colloquially as the Technology Cadetship Project. The aim of the project was to develop and promote more efficient pathways for school leavers to enter technical occupations in manufacturing industry. One of the key objectives was to establish entry level qualifications linked to on and off the job training in a cadetship arrangement. The term Technology Cadetship was developed to differentiate the level of training from that commonly found in apprenticeships and traineeships although the principle of combined off and on the training and mutual obligation of employer and employee is the same.

General Advice – Technology Cadetship arrangements

These qualifications may be delivered as part of a cadetship contract of training often called a Technology Cadetship. The units listed for all these qualifications are taken from a number of existing Training Packages. These units have been examined for suitability in a cadetship environment and repackaged to suit entry level technology based training in manufacturing.

Structure of Technology Cadetships

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The Technology Cadetship related qualifications are very flexible qualifications with a minimum number of core units and specialisations that maximise flexibility. The electives have been chosen to give entry and operational skills in a wide range of manufacturing technology application areas. Each qualification consists of specialist options. Each stream indicates the units that may be taken in that particular specialisation. It is intended at a later date to add additional units and streams to the qualifications.

Manufacturing Technology specialist streams

The streams available in the Manufacturing Technology qualifications offer a significant choice of electives. In MSA07v3.1, the streams available are:

Certificate III in Manufacturing Technology

- CAD/Drafting
- Manufacturing Operations
- Laboratory Operations
- Technical Officer
- Polymer Technology
- Metallurgy
- Structural Steel Detailing

Certificate IV in Manufacturing Technology

- CAD/Drafting
- Manufacturing Operations
- Laboratory Operations
- Technical Officer
- Polymer Technology

Diploma and Advanced Diplomas of Manufacturing Technology

- Polymer Technology
- Metallurgy
- Structural Steel Detailing

Reference to these specialisations may be included on any qualification statement that is issued. This could be achieved by adding the pathway descriptor below the formal title of the qualification as shown in example 1 or by an additional sentence as shown in example 2 below.

Example 1

Certificate III in Manufacturing Technology

Manufacturing Operations

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Example 2

Certificate III in Manufacturing Technology

Achieved through the Manufacturing Operations specialisation

It should also be noted that a person holding the Metal and Engineering Training Package Certificate III in Engineering – Technician will satisfy all of the requirements for a Certificate III in Manufacturing Technology, and with an additional five units of competency from the particular stream chosen will satisfy the requirements for a Certificate IV in Manufacturing Technology.

Qualification Pathways for Manufacturing Technology

The diagram below represents a model of the qualifications and pathways. Details are in the packaging rules for each qualification. Contact Manufacturing Skills Australia {www.mskills.com.au} for further details.

The polymer technology pathway is intended for people who plan to become polymer technicians, and who are not currently working as operators in the polymer industries. It is recommended that those who have already achieved a Certificate II from the Plastics, Rubber and Cablemaking Training Package would be better served by completing the Certificate III in Polymer Processing.

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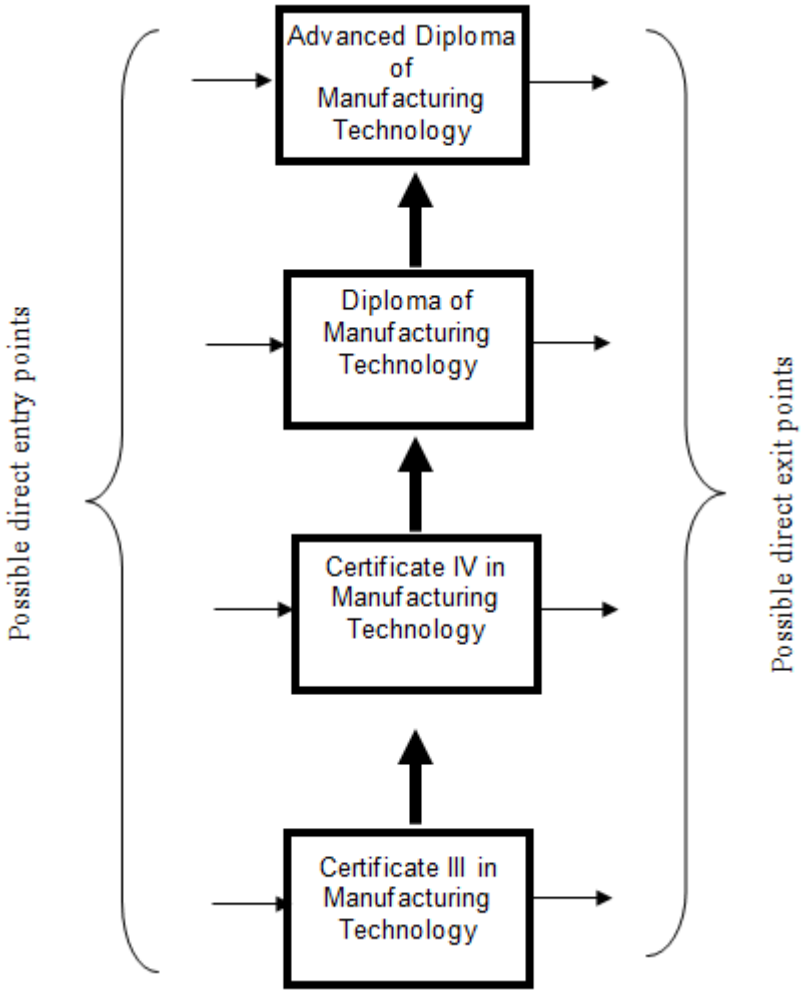

Apprenticeships

The Process Manufacturing and Competitive Manufacturing qualifications within this Training Package are potential New Apprenticeships. However these qualifications have been developed primarily for existing manufacturing workers, especially those working as or likely to become team leaders. For this reason existing worker New Apprenticeships may be more appropriate than application to school leavers.

VET in Schools

The delivery and assessment of competencies aligned to AQF 2 under this Training Package in appropriately designed VET in schools programs is encouraged. However, due to the requirements to demonstrate competency, it would be difficult for a school to assess and award the Competitive Manufacturing qualifications except in close partnership with an appropriate organisation from the industry. The AQTF rules are the overriding requirements in this regard.

The Certificate II in Manufacturing Technology has been developed specifically for use as a

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VET in schools program.

Prerequisites

Some units of competency have stated prerequisites (these have been kept to a minimum). In any approved training scheme, it is expected that competency will be attained in the prerequisite units before it is attained in the unit having the prerequisites. Imported units of competency may also have prerequisites which should be observed. In this situation a unit with two prerequisites will be counted as three units towards the qualification once competency has been attained in all units.

In an assessment of existing competency, it is possible to assess the unit and its prerequisites together as an integrated assessment. In this situation as well, a unit with two prerequisites will be counted as three units towards the qualification once competency has been attained in all units.

Note that the achievement of prerequisite competencies will be recognised for the award of the qualification, regardless of the method by which the participant has gained the competencies (e.g. prior learning and/or experience). A person entering at AQF 3 and proceeding through the qualifications in an orderly manner might be expected to be assessed on the prerequisites. A person entering at a higher AQF level might expect to be able to demonstrate their competence in the prerequisite in any of a number of ways, including an assessment integrated with the higher unit. RTOs developing formal learning pathways may find the prerequisite trail useful in designing a hierarchical learning program, or they may choose to integrate the prerequisite unit into the higher level unit for purposes of delivery and assessment, or some other approach.

Skill Sets in this Training Package

Definition

Skill sets are defined as single units of competency, or combinations of units of competency from an endorsed Training Package, which link to a licence or regulatory requirement, or defined industry need.

Wording on Statements of Attainment

Skill sets are a way of publicly identifying logical groupings of units of competency which meet an identified need or industry outcome. Skill sets are not qualifications.

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Where skill sets are identified in a Training Package, the Statement of Attainment can set out the competencies a person has achieved in a way that is consistent and clear for employers and others. This is done by including the wording "these competencies meet [insert skill set title or identified industry area] need" on the Statement of Attainment. This wording applies only to skill sets that are formally identified as such in the endorsed Training Package. See the 2010 edition of the AQF Implementation Handbook for advice on wording on Statements of Attainment. http://www.aqf.edu.au/Portals/0/Documents/Handbook/AQF_Handbook_07.pdf

Manufacturing Skill Sets

Industry has supported the creation of a range of Skill Sets to assist with meeting the competency needs of a developing sector.

Some job roles in some sectors of the industry do require a licence, however, there is no overall industry requirement for this and so no Skill Set associated with licensing has been developed. The industry manages the competency requirements of its workforce to ensure compliance with a vast web of regulatory requirements.

The Skill Sets in MSA07 have been developed in consultation with the industry and are based on logical clusters of units which meet critical industry needs. These Skill Sets consist of clusters of competencies which are commonly practiced together. They reflect an industry need to be able to recognise that a person can undertake these defined roles.

Trade Measurement Skill Sets

Responsibility for trade measurement matters will transfer to the Commonwealth on 1 July, 2010. The National Measurement Institute (NMI) has the responsibility of administering the national trade measurement legislation which encourages and promotes accurate measurement in the sale of goods.

Currently, there are approximately 100 trade measurement inspectors who undertake trade measurement activities that can be categorised into five distinct work functions including:

- instrument verification
- pre-packaged products
- trading practices
- licensing
- investigations.

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In addition to the inspectors, there are approximately 2000 verifiers who work under a servicing licence to verify measuring instruments and measures used in trade measurement. The principal occupations of verifiers are fitters, mechanics, quality assurance technicians, instrument manufacturers or importers and software developers. Verification of measuring instruments only represents about 10% of their core functions and they spend the majority (90%) of their time repairing, commissioning, manufacturing or selling measuring instruments. Verification involves testing instruments using National Test Procedures to ensure they consistently measure within requirements. Instruments that pass these tests are marked to indicate they are suitable for trade use.

Trade measuring instruments vary greatly in design and complexity. Examples include, shop scales, petrol pumps, weighbridges, machines for measuring length, LPG bulk flowmetering systems, rail weighbridges, high flow rate fuel measuring systems and belt weighers. To address this diversity, the industry and the National Measurement Institute have supported the development of five (5) Skill Sets for Trade Measurement Verification. These are:

- Trade Measurement Verification (Simple Measure)
- Trade Measurement Verification (Simple Measuring Instrument)
- Trade Measurement Verification (Limited Weighing Instrument)
- Trade Measurement Verification (Liquid Measuring Instrument Using Volume Measures)
- Trade Measurement Verification (Complex Measuring Instrument).

Each Skill Set consists of two (2) units that cover the competency requirements of conducting verification tests for the specific class of trade measuring instrument listed in the title.

From 2010, verifiers will need to achieve the relevant Skill Set before being eligible to work as a verifier under a trade measurement servicing licence.

- Skill Set: Trade Measurement Verification (Simple Measure)
- Skill Set: Trade Measurement Verification (Simple Measuring Instrument)
- Skill Set: Trade Measurement Verification (Limited Weighing Instrument)
- Skill Set: Trade Measurement Verification (Liquid Measuring Instrument Using Volume Measures)
- Skill Set: Trade Measurement Verification (Complex Measuring Instrument)

High Pressure Water Jetting Skill Sets

Industry has supported the creation of a range of Skill Sets to assist with meeting the competency needs of a developing sector.

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Some job roles in some sectors of the industry do require a licence, however, there is no overall industry requirement for this and so no Skill Set associated with licensing has been developed. The industry manages the competency requirements of its workforce to ensure compliance with a vast web of regulatory requirements. The Skill Sets below have been developed in consultation with the industry and are based on logical clusters of units which meet critical industry needs.

These Skill Sets consist of clusters of competencies which are commonly practiced together. They reflect an industry-wide need to be able to recognise that a person can undertake these defined roles.

- Skill Set: High pressure water jetting operator
- Skill Set: High pressure water jetting assistant
- Skill Set: Confined space work team

Boiler operations Skill Sets

Two Skill Sets have been developed for boiler licensing:

- Licence to operate a standard boiler
- Licence to operate an advanced boiler

Employability Skills

Employability Skills replacing Key Competency information from 2006

In May 2005, the approach to incorporate Employability Skills within Training Package qualifications and units of competency was endorsed. As a result, from 2006 Employability Skills will progressively replace Key Competency information in Training Packages.

Background to Employability Skills

Employability Skills are also sometimes referred to as generic skills, capabilities or Key Competencies. The Employability Skills discussed here build on the Mayer Committee's Key Competencies, which were developed in 1992 and attempted to describe generic competencies for effective participation in work.

The Business Council of Australia (BCA) and the Australian Chamber of Commerce and Industry (ACCI), produced the *Employability Skills for the Future* report in 2002 in consultation with other peak employer bodies and with funding provided by the Department of Education, Science and Training (DEST) and the Australian National Training Authority (ANTA). Officially released by Dr Nelson (Minister for Education, Science and Training) on 23 May 2002, copies of the report are available from the DEST website at: http://www.dest.gov.au/archive/ty/publications/employability_skills/index.htm.

The report indicated that business and industry now require a broader range of skills than the Mayer Key Competencies Framework and featured an Employability Skills Framework identifying eight Employability Skills*:

- communication
- teamwork

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- problem solving
- initiative and enterprise
- planning and organising
- self-management
- learning
- technology.

The report demonstrated how Employability Skills can be further described for particular occupational and industry contexts by sets of facets. The facets listed in the report are the aspects of the Employability Skills that the sample of employers surveyed identified as being important work skills. These facets were seen by employers as being dependent both in their nature and priority on an enterprise's business activity.

* Personal attributes that contribute to employability were also identified in the report but are not part of the Employability Skills Framework.

Employability Skills Framework

The following table contains the Employability Skills facets identified in the report

Employability Skills for the Future.

Skill	**Facets** Aspects of the skill that employers identify as important. The nature and application of these facets will vary depending on industry and job type.
Communication that contributes to productive and harmonious relations across employees and customers	• listening and understanding • speaking clearly and directly • writing to the needs of the audience • negotiating responsively • reading independently • empathising • using numeracy effectively • understanding the needs of internal and external customers • persuading effectively • establishing and using networks • being assertive • sharing information • speaking and writing in languages other than English
Teamwork that contributes to productive working relationships and outcomes	• working across different ages irrespective of gender, race, religion or political persuasion • working as an individual and as a member of

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	a team • knowing how to define a role as part of the team • applying teamwork to a range of situations e.g. futures planning and crisis problem solving • identifying the strengths of team members • coaching and mentoring skills, including giving feedback
Problem solving that contributes to productive outcomes	• developing creative, innovative and practical solutions • showing independence and initiative in identifying and solving problems • solving problems in teams • applying a range of strategies to problem solving • using mathematics, including budgeting and financial management to solve problems • applying problem-solving strategies across a range of areas • testing assumptions, taking into account the context of data and circumstances • resolving customer concerns in relation to complex project issues
Initiative and enterprise that contribute to innovative outcomes	• adapting to new situations • developing a strategic, creative and long-term vision • being creative • identifying opportunities not obvious to others • translating ideas into action • generating a range of options • initiating innovative solutions
Planning and organising that contribute to long and short-term strategic planning	• managing time and priorities - setting time lines, coordinating tasks for self and with others • being resourceful • taking initiative and making decisions • adapting resource allocations to cope with contingencies • establishing clear project goals and deliverables • allocating people and other resources to tasks • planning the use of resources, including time

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	management • participating in continuous improvement and planning processes • developing a vision and a proactive plan to accompany it
	• predicting - weighing up risk, evaluating alternatives and applying evaluation criteria • collecting, analysing and organising information • understanding basic business systems and their relationships
Self-management that contributes to employee satisfaction and growth	• having a personal vision and goals • evaluating and monitoring own performance • having knowledge and confidence in own ideas and visions • articulating own ideas and visions • taking responsibility
Learning that contributes to ongoing improvement and expansion in employee and company operations and outcomes	• managing own learning • contributing to the learning community at the workplace • using a range of mediums to learn - mentoring, peer support and networking, IT and courses • applying learning to technical issues (e.g. learning about products) and people issues (e.g. interpersonal and cultural aspects of work) • having enthusiasm for ongoing learning • being willing to learn in any setting - on and off the job • being open to new ideas and techniques • being prepared to invest time and effort in learning new skills • acknowledging the need to learn in order to accommodate change
Technology that contributes to the effective carrying out of tasks	• having a range of basic IT skills • applying IT as a management tool • using IT to organise data • being willing to learn new IT skills • having the OHS knowledge to apply technology • having the appropriate physical capacity

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Employability Skills Summary

An Employability Skills Summary exists for each qualification. Summaries provide a lens through which to view Employability Skills at the qualification level and capture the key aspects or facets of the Employability Skills that are important to the job roles covered by the qualification. Summaries are designed to assist trainers and assessors to identify and include important industry application of Employability Skills in learning and assessment strategies.

The following is important information for trainers and assessors about Employability Skills

Summaries.

- Employability Skills Summaries provide examples of how each skill is applicable to the job roles covered by the qualification.
- Employability Skills Summaries contain general information about industry context which is further explained as measurable outcomes of performance in the units of competency in each qualification.
- The detail in each Employability Skills Summary will vary depending on the range of job roles covered by the qualification in question.
- Employability Skills Summaries are not exhaustive lists of qualification requirements or checklists of performance (which are separate assessment tools that should be designed by trainers and assessors after analysis at the unit level).
- Employability Skills Summaries contain information that may also assist in building learners' understanding of industry and workplace expectations.

Industry Requirements for Employability Skills

This is a technology based industry and a key role of manufacturing personnel is the solving of problems. They are expected to operate in both permanent and *ad hoc* teams as required. The communication of key safety, health, environmental and procedural/operational information to other personnel is a vital requirement.

Assessment Guidelines

Introduction

These Assessment Guidelines provide the endorsed framework for assessment of units of competency in this Training Package. They are designed to ensure that assessment is consistent with the *Australian Quality Training Framework (AQTF) Essential Standards for Initial and Continuing Registration*. Assessments against the units of competency in this Training Package must be carried out in accordance with these Assessment Guidelines.

Assessment System Overview

This section provides an overview of the requirements for assessment when using this Training Package, including a summary of the AQTF requirements; licensing and registration requirements; and assessment pathways.

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Quality assessment underpins the credibility of the vocational education and training sector. The Assessment Guidelines of a Training Package are an important tool in supporting quality assessment.

Assessment within the National Skills Framework is the process of collecting evidence and making judgements about whether competency has been achieved to confirm whether an individual can perform to the standards expected in the workplace, as expressed in the relevant endorsed unit of competency.

Assessment must be carried out in accordance with the:

- benchmarks for assessment
-
- principles of assessment
- rules of evidence
- assessment requirements set out in the AQTF

Benchmarks for Assessment

The endorsed units of competency in this Training Package are the benchmarks for assessment. As such, they provide the basis for nationally recognised Australian Qualifications Framework (AQF) qualifications and Statements of Attainment issued by Registered Training Organisations (RTOs).

Principles of Assessment

All assessments carried out by RTOs are required to demonstrate compliance with the principles of assessment:

- validity
- reliability
- flexibility
- fairness
- sufficiency

These principles must be addressed in the:

- design, establishment and management of the assessment system for this Training Package
- development of assessment tools, and
- the conduct of assessment.

Validity

Assessment is valid when the process is sound and assesses what it claims to assess. Validity requires that:

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(a) assessment against the units of competency must cover the broad range of skills and knowledge that are essential to competent performance

(b) assessment of knowledge and skills must be integrated with their practical application

(c) judgement of competence must be based on sufficient evidence (that is, evidence gathered on a number of occasions and in a range of contexts using different assessment methods). The specific evidence requirements of each unit of competency provide advice on sufficiency

Reliability

Reliability refers to the degree to which evidence presented for assessment is consistently interpreted and results in consistent assessment outcomes. Reliability requires the assessor to have the required competencies in assessment and relevant vocational competencies (or to assess in conjunction with someone who has the vocational competencies). It can only be achieved when assessors share a common interpretation of the assessment requirements of the unit(s) being assessed.

Flexibility

To be flexible, assessment should reflect the candidate's needs; provide for recognition of competencies no matter how, where or when they have been acquired; draw on a range of methods appropriate to the context, competency and the candidate; and support continuous competency development.

Fairness

Fairness in assessment requires consideration of the individual candidate's needs and characteristics, and any reasonable adjustments that need to be applied to take account of them. It requires clear communication between the assessor and the candidate to ensure that the candidate is fully informed about, understands and is able to participate in, the assessment process, and agrees that the process is appropriate. It also includes an opportunity for the person being assessed to challenge the result of the assessment and to be reassessed if necessary.

Sufficiency

Sufficiency relates to the quality and quantity of evidence assessed. It requires collection of enough *appropriate* evidence to ensure that all aspects of competency have been satisfied and that competency can be demonstrated repeatedly. Supplementary sources of evidence may be necessary. The specific evidence requirements of each unit of competency provide advice on sufficiency. Sufficiency is also one of the rules of evidence.

Rules of Evidence

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The rules of evidence guide the collection of evidence that address the principles of validity and reliability, guiding the collection of evidence to ensure that it is valid, sufficient, current and authentic.

Valid

Valid evidence must relate directly to the requirements of the unit of competency. In ensuring evidence is valid, assessors must ensure that the evidence collected supports demonstration of the outcomes and performance requirements of the unit of competency together with the knowledge and skills necessary for competent performance. Valid evidence must encapsulate the breadth and depth of the unit of competency, which will necessitate using a number of different assessment methods.

Sufficient

Sufficiency relates to the quality and quantity of evidence assessed. It requires collection of enough appropriate evidence to ensure that all aspects of competency have been satisfied and that competency can be demonstrated repeatedly. Supplementary sources of evidence may be necessary. The specific evidence requirements of each unit of competency provide advice on sufficiency.

Current

In assessment, currency relates to the age of the evidence presented by a candidate to demonstrate that they are still competent. Competency requires demonstration of current performance, so the evidence collected must be from either the present or the very recent past.

Authentic

To accept evidence as authentic, an assessor must be assured that the evidence presented for assessment is the candidate's own work.

Assessment Requirements of the Australian Quality Training Framework

Assessment leading to nationally recognised AQF qualifications and Statements of Attainment in the vocational education and training sector must meet the requirements of the AQTF as expressed in the AQTF 2010 *Essential Standards for Registration.*

The AQTF 2010 *Essential Standards for Initial and Continuing Registration* can be downloaded from <www.training.com.au>.

The following points summarise the assessment requirements.

Registration of Training Organisations

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Assessment must be conducted by, or on behalf of, an RTO formally registered by a State or Territory Registering Body in accordance with the AQTF. The RTO must have the specific units of competency and/or AQF qualifications on its scope of registration.

Quality Training and Assessment

Each RTO must provide quality training and assessment across all its operations. See the AQTF 2010 *Essential Standards for Initial and Continuing Registration,* Standard 1.

Assessor Competency Requirements

Each person involved in training and assessment must be competent for the functions they perform. See the AQTF 2010 *Essential Standards for Initial and Continuing Registration,* Standard 1 for assessor (and trainer) competency requirements. See also the AQTF 2010 *Users' Guide to the Essential Standards for Registration* – Appendix 2.

Assessment Requirements

The RTOs assessments, including RPL, must meet the requirements of the relevant endorsed Training Package. See the AQTF 2010 *Essential Standards for Initial and Continuing Registration*.

Assessment Strategies

Each RTO must have strategies for training and assessment that meet the requirements of the relevant Training Package or accredited course and are developed in consultation with industry stakeholders. See the AQTF 2010 *Essential Standards for Initial and Continuing Registration*.

National Recognition

Each RTO must recognise the AQF qualifications and Statements of Attainment issued by any other RTO. See the AQTF 2010 *Essential Standards for Initial and Continuing Registration*..

Access and Equity and Client Outcomes

Each RTO must adhere to the principles of access and equity and maximise outcomes for its clients. See the AQTF 2010 *Essential Standards for Initial and Continuing Registration.*

Monitoring Assessments

Training and/or assessment provided on behalf of the RTO must be monitored to ensure that it is in accordance with all aspects of the AQTF 2010 *Essential Standards for Initial and Continuing Registration*.

Recording Assessment Outcomes

Each RTO must manage records to ensure their accuracy and integrity. See the AQTF 2010 *Essential Standards for Initial and Continuing Registration*.

Issuing AQF qualifications and Statement of Attainment

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Each RTO must issue AQF qualifications and Statements of Attainment that meet the requirements of the current *AQF Implementation Handbook* and the endorsed Training Packages within the scope of its registration. An AQF qualification is issued once the full requirements for a qualification, as specified in the nationally endorsed Training Package are met. A Statement of Attainment is issued when an individual has completed one or more units of competency from nationally recognised qualification(s)/courses(s). See the AQTF and the edition of the *AQF Implementation Handbook*—available on the AQF Council website <www.aqf.edu.au >

Licensing/Registration Requirements

This section provides information on licensing/registration requirements for this Training Package, with the following important disclaimer.

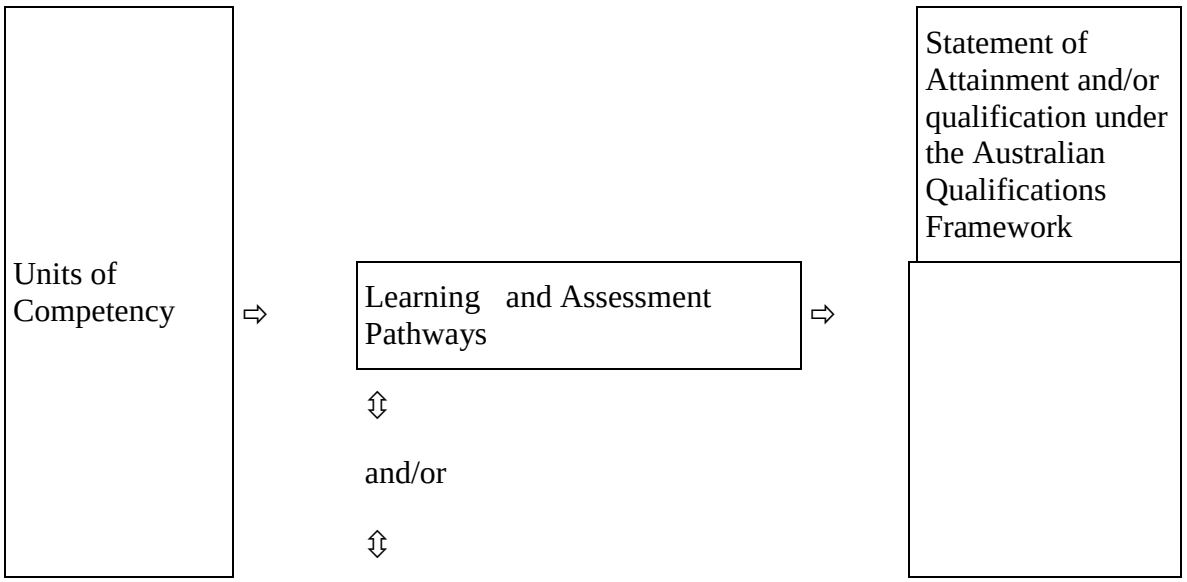
The developers of this Training Package consider that no licensing or registration requirements apply to RTOs, assessors or candidates with respect to this Training Package. Contact the relevant State or Territory Department(s) to check if there are any licensing or registration requirements with which you must comply. For further information on this topic contact www.mskills.com.au.

Pathways

The competencies in this Training Package may be attained in a number of ways including through:

- formal or informal education and training
- experiences in the workplace
- general life experience, and/or
- any combination of the above.

Assessment under this Training Package leading to an AQF qualification or Statement of Attainment may follow a learning and assessment pathway, or a recognition pathway, or a combination of the two as illustrated in the following diagram.



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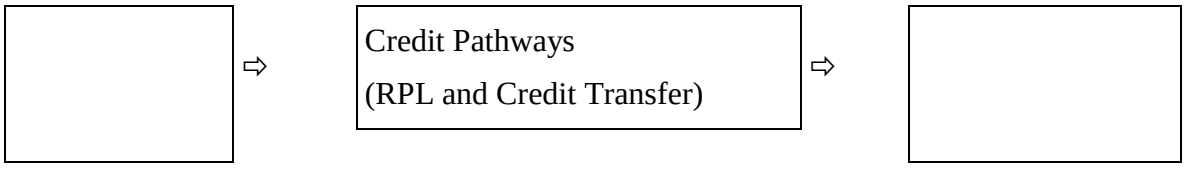

Each of these assessment pathways leads to full recognition of competencies held – the critical issue is that the candidate is competent, not how the competency was acquired.

Assessment, by any pathway, must comply with the assessment requirements set out in the Assessment Guidelines of the Training Package , the AQTF and, where relevant, the Australian Qualifications Framework.

Learning and Assessment Pathways

Usually, learning and assessment are integrated, with evidence being collected and feedback provided to the candidate at anytime throughout the learning and assessment process.

Learning and assessment pathways may include structured programs in a variety of contexts using a range of strategies to meet different learner needs. Structured learning and assessment programs could be: group-based, work-based, project-based, self-paced, action learning-based; conducted by distance or e-learning; and/or involve practice and experience in the workplace.

Learning and assessment pathways to suit Australian Apprenticeships have a mix of formal structured training and structured workplace experience with formative assessment activities through which candidates can acquire and demonstrate skills and knowledge from the relevant units of competency.

Credit Pathways

Credit is the value assigned for the recognition of equivalence in content between different types of learning and/or qualifications which reduces the volume of learning required to achieve a qualification.

Credit arrangements must be offered by all RTOs that offer Training Package qualifications. Each RTO must have a systematic institutional approach with clear, accessible and transparent policies and procedures.

Competencies already held by individuals can be formally assessed against the units of competency in this Training Package, and should be recognised regardless of how, when or where they were acquired, provided that the learning is relevant to the unit of competency outcomes.

Recognition of Prior Learning

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Recognition of Prior Learning (RPL) is an assessment process which determines the credit outcomes of an individual application for credit.

The availability of Recognition of Prior Learning (RPL) provides all potential learners with access to credit opportunities.

The recognition of prior learning pathway is appropriate for candidates who have previously attained skills and knowledge and who, when enrolling in qualifications, seek to shorten the duration of their training and either continue or commence working. This may include the following groups of people:

- existing workers;
- individuals with overseas qualifications;
- recent migrants with established work histories;
- people returning to the workplace; and
- people with disabilities or injuries requiring a change in career.
-

As with all assessment, RPL assessment should be undertaken by academic or teaching staff with expertise in the subject, content of skills area, as well as knowledge of and expertise in RPL assessment policies and procedures.

Assessment methods used for RPL should provide a range of ways for individuals to demonstrate that they have met the required outcomes and can be granted credit. These might include:

- questioning (oral or written)
- consideration of a portfolio and review of contents
- consideration of third party reports and/or other documentation such as documentation such as articles, reports, project material, papers, testimonials or other products prepared by the RPL applicant that relate to the learning outcomes of the relevant qualification component
- mapping of learning outcomes from prior formal or non-formal learning to the relevant qualification components
- observation of performance, and
- participation in structured assessment activities the individual would normally be required to undertake if they were enrolled in the qualification component/s.

In a Recognition of Prior Learning (RPL) pathway, the candidate provides current, quality evidence of their competency against the relevant unit of competency. This process may be directed by the candidate and verified by the assessor. Where the outcomes of this process indicate that the candidate is competent, structured training is not required. The RPL requirements of the AQTF must be met.

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As with all assessment, the assessor must be confident that the evidence indicates that the candidate is currently competent against the endorsed unit of competency. This evidence may take a variety of forms and might include certification, references from past employers, testimonials from clients, work samples and/or observation of the candidate. The onus is on candidates to provide sufficient evidence to satisfy assessors that they currently hold the relevant competencies. In judging evidence, the assessor must ensure that the evidence of prior learning is:

- authentic (the candidate's own work);
- valid (directly related to the current version of the relevant endorsed unit of competency);
- reliable (shows that the candidate consistently meets the endorsed unit of competency);
- current (reflects the candidate's current capacity to perform the aspect of the work covered by the endorsed unit of competency); and
- sufficient (covers the full range of elements in the relevant unit of competency and addresses the four dimensions of competency, namely task skills, task management skills, contingency management skills, and job/role environment skills).

Credit Transfer

Credit transfer is a process which provides learners with agreed and consistent credit outcomes based on equivalences in content between matched qualifications.

This process involves education institutions:

- mapping, comparing and evaluating the extent to which the defined *learning outcomes and assessment requirements* of the individual *components of one qualification* are equivalent to the learning outcomes and assessment requirements of the individual components of another qualification
- making an educational judgment of the credit outcomes to be assigned between the matched components of the two qualifications
- setting out the agreed credit outcomes in a documented arrangement or agreement, and
- publicising the arrangement/agreement and credit available.

Combination of Pathways

Credit may be awarded on the basis of a combination of credit transfer plus an individual RPL assessment for additional learning. Once credit has been awarded on the basis of RPL, subsequent credit transfer based on these learning outcomes should not include revisiting the RPL assessment but should be based on credit transfer or articulation or other arrangements between providers.

Where candidates for assessment have gained competencies through work and life experience and gaps in their competence are identified, or where they require training in new areas, a combination of pathways may be appropriate.

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In such situations, the candidate may undertake an initial assessment to determine their current competency. Once current competency is identified, a structured learning and assessment program ensures that the candidate acquires the required additional competencies identified as gaps.

Assessor Requirements

This section identifies the specific requirements on the vocational competence and experience for assessors, to ensure that they meet the needs of industry and their obligations under AQTF, and clarifies how others may contribute to the assessment process where one person alone does not hold all the required competencies.

Assessor Competencies

The AQTF specifies mandatory competency requirements for assessors. For information, Element 1.4 from the AQTF 2007 *Essential Standards for Registration* follows:

1.4 Training and assessment are conducted by trainers and assessors who:

a) have the necessary training and assessment competencies as determined by the National Quality Council or its successors, and

b) have the relevant vocational competencies at least to the level being delivered or assessed, and

c) can demonstrate current industry skills directly relevant to the training/assessment being undertaken, and

d) continue to develop their Vocational Education and Training (VET) knowledge and skills as well as their industry currency and trainer/assessor competence.

* See AQTF 2010 *Users' Guide to the Essential Standards for Registration* – Appendix 2

Designing Assessment Tools

This section provides an overview on the use and development of assessment tools.

Use of Assessment Tools

Assessment tools provide a means of collecting the evidence that assessors use in making judgements about whether candidates have achieved competency.

There is no set format or process for the design, production or development of assessment tools. Assessors may use prepared assessment tools, such as those specifically developed to support this Training Package, or they may develop their own.

Using Prepared Assessment Tools

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If using prepared assessment tools, assessors should ensure these relate to the current version of the relevant unit of competency. The current unit of competency can be checked on the National Register <*www.ntis.gov.au*>.

Developing Assessment Tools

When developing their own assessment tools, assessors must ensure that the tools:

- are benchmarked against the relevant unit or units of competency;
- are reviewed as part of the validation of assessment strategies required under the AQTF; and
- meet the assessment requirements expressed in the AQTF 2010 *Essential Standards for Initial and Continuing Registration*.

A key reference for assessors developing assessment tools is TAE10 Training and Education Training Package.

Language, Literacy and Numeracy

The design of assessment tools must reflect the language, literacy and numeracy competencies required for the performance of a task in the workplace and not exceed these expectations.

Conducting Assessment

This section details the mandatory assessment requirements and provides information on equity in assessment including reasonable adjustment.

Mandatory Assessment Requirements

Assessments must meet the criteria set out in the AQTF 2010 *Essential Standards for Initial and Continuing Registration*. For information, the mandatory assessment requirements from Standard 1 from the AQTF 2010 *Essential Standards for Initial and Continuing Registration* are as follows:

1.5 Assessment, including Recognition of Prior Learning (RPL):

a) meets the requirements of the relevant Training Package or accredited course
b) is conducted in accordance with the principles of assessment and the rules of evidence
c) meets workplace and, where relevant, regulatory requirements
d) is systematically validated.

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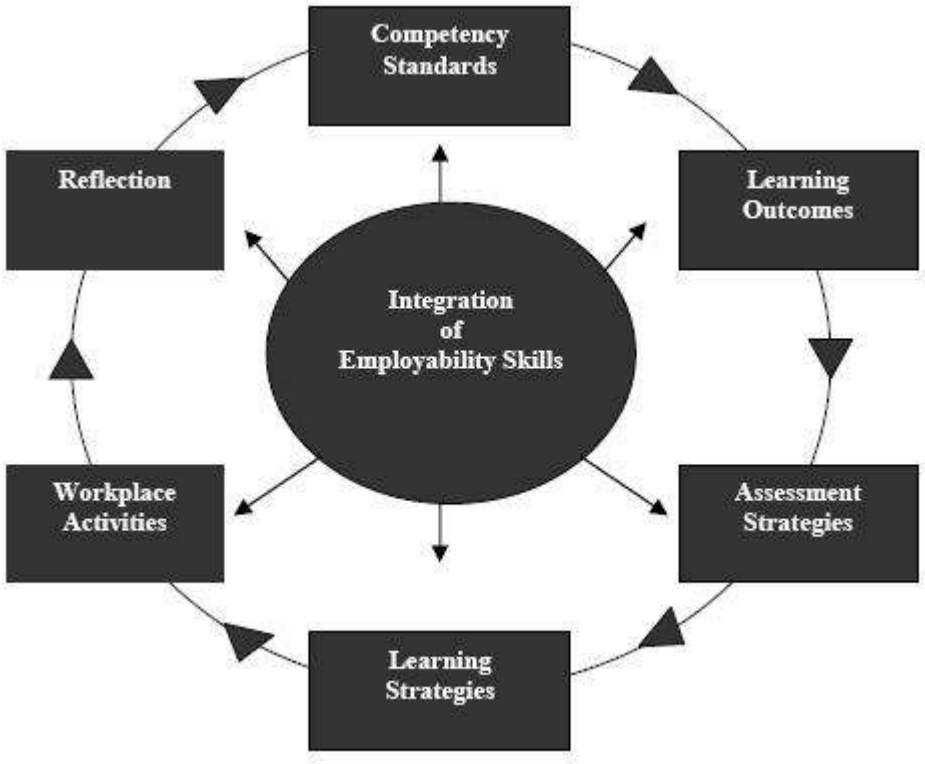
Assessment of Employability Skills

Employability Skills are integral to workplace competency. As such, they must be considered in the design, customisation, delivery and assessment of vocational education and training programs in an integrated and holistic way, as represented diagrammatically below.



Employability Skills are embedded within each unit of competency, and an Employability Skills Summary is available for each qualification. Training providers must use Employability Skills information in order to design valid and reliable training and assessment strategies. This analysis could include:

- reviewing units of competency to locate relevant Employability Skills and determine how they are applied within the unit
- analysing the Employability Skills Summary for the qualification in which the unit or units are packaged to help clarify relevant industry and workplace contexts and the application of Employability Skills at that qualification outcome
- designing training and assessment to address Employability Skills requirements.

The National Quality Council has endorsed a model for assessing and reporting Employability Skills, which contains further suggestions about good practice strategies in teaching, assessing, learning and reporting Employability Skills. The model is available from <http://www.training.com.au/>.

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The endorsed approach includes learners downloading qualification specific Employability Skills Summaries for Training Package qualifications from an online repository at <http://employabilityskills.training.com.au>

For more information on Employability Skills in

Manufacturing Skills Australia Training Packages go to the Manufacturing Skills Australia website at www.mskills.com.au.

Employability Skills are reported on each qualification using the following statement on the qualification testamur: "A summary of the Employability Skills developed through this qualification can be downloaded from http://employabilityskills.training.com.au "

Access and Equity

An individual's access to the assessment process should not be adversely affected by restrictions placed on the location or context of assessment beyond the requirements specified in this Training Package: training and assessment must be bias-free.

Under the rules for their development, Training Packages must reflect and cater for the increasing diversity of Australia's VET clients and Australia's current and future workforce. The flexibilities offered by Training Packages should enhance opportunities and potential outcomes for all people so that we can all benefit from a wider national skills base and a shared contribution to Australia's economic development and social and cultural life.

Reasonable Adjustments

It is important that education providers take meaningful, transparent and reasonable steps to consult, consider and implement reasonable adjustments for students with disability.

Under the Disability Standards for Education 2005, education providers must make reasonable adjustments for people with disability to the maximum extent that those adjustments do not cause that provider unjustifiable hardship. While 'reasonable adjustment' and 'unjustifiable hardship' are different concepts and involve different considerations, they both seek to strike a balance between the interests of education providers and the interests of students with and without disability.

An adjustment is any measure or action that a student requires because of their disability, and which has the effect of assisting the student to access and participate in education and training on the same basis as students without a disability. An adjustment is reasonable if it achieves this purpose while taking into account factors such as the nature of the student's disability, the views of the student, the potential effect of the adjustment on the student and others who might be affected, and the costs and benefits of making the adjustment.

An education provider is also entitled to maintain the academic integrity of a course or program and to consider the requirements or components that are inherent or essential to its nature when assessing whether an adjustment is reasonable. There may be more than one adjustment that is reasonable in a given set of circumstances; education providers are required to make adjustments that are reasonable and that do not cause them unjustifiable hardship.

The Training Package Guidelines provides more information on reasonable adjustment, including examples of adjustments. *Go to http://www.deewr.gov.au/tpdh/Pages/home.aspx .*

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Further Sources *of Information*

The section provides a listing of useful contacts and resources to assist assessors in planning, designing, conducting and reviewing of assessments against this Training Package.

Contacts

Industry Skills Council

Manufacturing Skills Australia
Level 8, 80 Arthur Street
North Sydney NSW 2060

Ph: 02 9955 5500
Fx: 02 9955 8044
W: www.mskills.com.au

Technical and Vocational Education and Training (TVET) Australia Limited
Level 21, 390 St Kilda Road, Melbourne
VIC 3150
PO Box 12211, A'Beckett Street Post Office, Melbourne, Victoria, 8006
Ph: +61 3 9832 8100
Fax: +61 3 9832 8198
Email: sales@tvetaustralia.com.au
Web: www.tvetaustralia.com.au

For information on the TAE10 Training and Education Training Package contact:

Innovation & Business Skills Australia

Telephone: (03) 9815 7000
Facsimile: (03) 9815 7001
Email: virtual@ibsa.org.au

Web: www.ibsa.org.au

General Resources

AQF Implementation Handbook, Fourth Edition 2007. Australian Qualifications Framework Advisory Board, 2002 <www.aqf.edu.au>

Australian Quality Training Framework (AQTF) and *AQTF 2010 Users' Guide to the Essential Standards for Registration – http://www.training.com.au/pages/menuitem5cbe14d51b49dd34b225261017a62dbc.aspx*

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For general information and resources go to http://www.training.com.au/

The National Register is an electronic database providing comprehensive information about RTOs, Training Packages and accredited courses - <www.ntis.gov.au>

The Training Package Development Handbook site provides National Quality Council policy for the development of Training Packages. The site also provides guidance material for the application of that policy, and other useful information and links.
http://www.deewr.gov.au/Skills/Overview/Policy/TPDH/Pages/main.aspx

A**ssessment Resources**

Registered training organisations (RTOs) are at the forefront of vocational education and training (VET) in Australia. They translate the needs of industry into relevant, quality, client-focussed training and assessment.

RTOs should strive for innovation in VET teaching and learning practices and develop highly flexible approaches to assessment which take cognisance of specific needs of learners, in order to improve delivery and outcomes of training.

Resources can be purchased or accessed from:

- TVET Australia – provides an integrated service to enable users of the national training system to identify and acquire training materials, identify copyright requirements and enter licenses for use of that material consistent with the scope and direction of the NQC.

  http://www.productservices.tvetaustralia.com.au/

- Manufacturing Skills Australia

Level 3, 104 Mount Street

North Sydney NSW 2060

Ph: 02 9955 5500

Fx: 02 9955 8044

W: www.mskills.com.au

Competency Standards

What is competency?

The broad concept of industry competency concerns the ability to perform particular tasks and duties to the standard of performance expected in the workplace. Competency requires the application of specified skills, knowledge and attitudes relevant to effective participation in an industry, industry sector or enterprise.

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Competency covers all aspects of workplace performance and involves performing individual tasks; managing a range of different tasks; responding to contingencies or breakdowns; and, dealing with the responsibilities of the workplace, including working with others. Workplace competency requires the ability to apply relevant skills, knowledge and attitudes consistently over time and in the required workplace situations and environments. In line with this concept of competency Training Packages focus on what is expected of a competent individual in the workplace as an outcome of learning, rather than focussing on the learning process itself.

Competency standards in Training Packages are determined by industry to meet identified industry skill needs. Competency standards are made up of a number of units of competency each of which describes a key function or role in a particular job function or occupation. Each unit of competency within a Training Package is linked to one or more AQF qualifications.

Contextualisation of Units of Competency by RTOs

Registered Training Organisation (RTOs) may contextualise units of competency to reflect local outcomes required. Contextualisation could involve additions or amendments to the unit of competency to suit particular delivery methods, learner profiles, specific enterprise equipment requirements, or to otherwise meet local needs. However, the integrity of the overall intended outcome of the unit of competency must be maintained.

Any contextualisation of units of competency in this endorsed Training Package must be within the bounds of the following advice. In contextualising units of competency, RTOs:

- must not remove or add to the number and content of elements and performance criteria
- may add specific industry terminology to performance criteria where this does not distort or narrow the competency outcomes
- may make amendments and additions to the range statement as long as such changes do not diminish the breadth of application of the competency and reduce its portability, and/or
- may add detail to the evidence guide in areas such as the critical aspects of evidence or resources and infrastructure required where these expand the breadth of the competency but do not limit its use.

Components of Units of Competency

The components of units of competency are summarised below, in the order in which they appear in each unit of competency.

Unit Title

The unit title is a succinct statement of the outcome of the unit of competency. Each unit of competency title is unique, both within and across Training Packages.

Unit Descriptor

The unit descriptor broadly communicates the content of the unit of competency and the skill area it addresses. Where units of competency have been contextualised from units of

competency from other endorsed Training Packages, summary information is provided. There may also be a brief second paragraph that describes its relationship with other units of competency, and any licensing requirements.

Employability Skills statement

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A standard Employability Skills statement appears in each unit of competency. This statement directs trainers and assessors to consider the information contained in the Employability Skills Summary in which the unit of competency is packaged.

Prerequisite Units (optional)

If there are any units of competency that must be completed before the unit, these will be listed.

Application of the Unit

This sub-section fleshes out the unit of competency's scope, purpose and operation in different contexts, for example, by showing how it applies in the workplace.

Competency Field (Optional)

The competency field either reflects the way the units of competency are categorised in the Training Package or denotes the industry sector, specialisation or function. It is an optional component of the unit of competency.

Sector (optional)

The industry sector is a further categorisation of the competency field and identifies the next classification, for example an elective or supervision field.

Elements of Competency

The elements of competency are the basic building blocks of the unit of competency. They describe in terms of outcomes the significant functions and tasks that make up the competency.

Performance Criteria

The performance criteria specify the required performance in relevant tasks, roles, skills and in the applied knowledge that enables competent performance. They are usually written in passive voice. Critical terms or phrases may be written in bold italics and then defined in range statement, in the order of their appearance in the performance criteria.

Required Skills and Knowledge

The essential skills and knowledge are either identified separately or combined. Knowledge identifies what a person needs to know to perform the work in an informed and effective manner. Skills describe the application of knowledge to situations where understanding is converted into a workplace outcome.

Range Statement

The range statement provides a context for the unit of competency, describing essential operating conditions that may be present with training and assessment, depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts. As applicable, the meanings of key terms used in the performance criteria will also be explained in the range statement.

Evidence Guide

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The evidence guide is critical in assessment as it provides information to the Registered Training Organisation (RTO) and assessor about how the described competency may be demonstrated. The evidence guide does this by providing a range of evidence for the assessor to make determinations, and by providing the assessment context. The evidence guide describes:

- conditions under which competency must be assessed including variables such as the assessment environment or necessary equipment
- relationships with the assessment of any other units of competency
- suitable methodologies for conducting assessment including the potential for workplace simulation
- resource implications, for example access to particular equipment, infrastructure or situations
- how consistency in performance can be assessed over time, various contexts and with a range of evidence, and expectations at the AQF qualification level involved

Employability Skills in units of competency

The detail and application of Employability Skills facets will vary according to the job-role requirements of each industry. In developing Training Packages, industry stakeholders are consulted to identify appropriate facets of Employability Skills which are incorporated into the relevant units of competency and qualifications.

Employability Skills are not a discrete requirement contained in units of competency (as was the case with Key Competencies). Employability Skills are specifically expressed in the context of the work outcomes described in units of competency and will appear in elements, performance criteria, range statements and evidence guides. As a result, users of Training Packages are required to review the entire unit of competency in order to accurately determine Employability Skills requirements.

How Employability Skills relate to the Key Competencies

The eight nationally agreed Employability Skills now replace the seven Key Competencies in Training Packages. Trainers and assessors who have used Training Packages prior to the introduction of Employability Skills may find the following comparison useful.

Employability Skills	**Mayer Key Competencies**
Communication	Communicating ideas and information
Teamwork	Working with others and in teams
Problem solving	Solving problems Using mathematical ideas and techniques
Initiative and enterprise	
Planning and organising	Collecting, analysing and organising information Planning and organising activities

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Self-management	
Learning	
Technology	Using technology

When analysing the above table it is important to consider the relationship and natural overlap of Employability Skills. For example, using technology may involve communication skills and combine the understanding of mathematical concepts.

Explicitly embedding Employability Skills in units of competency

This Training Package seeks to ensure that industry-endorsed Employability Skills are explicitly embedded in units of competency. The application of each skill and the level of detail included in each part of the unit will vary according to industry requirements and the nature of the unit of competency.

Employability Skills must be both explicit and embedded within units of competency. This means that Employability Skills will be:

- embedded in units of competency as part of the other performance requirements that make up the competency as a whole
- explicitly described within units of competency to enable Training Packages users to identify accurately the performance requirements of each unit with regards to Employability Skills.

This Training Package also seeks to ensure that Employability Skills are well-defined and written into units of competency so that they are apparent, clear and can be delivered and assessed as an essential component of unit work outcomes.

The following table contains examples of embedded Employability Skills for each component of a unit of competency. Please note that in the examples below the bracketed skills are provided only for clarification and will not be present in units of competency within this Training Package.

Example Employability Skills unit

Unit component	**Example of embedded Employability Skill**
Unit Title	Optimise process/plant area (initiative and enterprise, problem solving, technology)
Unit Descriptor	This competency covers the ability to optimise the process performance of a complete plant area. It includes ensuring that production systems comply with Health, Safety and Environment (HSE) requirements, that process, plant and equipment utilisation is planned and carried out, and that problems are solved to fully meet operational needs and ensure that production of finished goods meets customer requirements.

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	(Self management, technology, initiative and enterprise, planning and organising, problem solving)
Element	Coordinate corrective and/or optimisation action plan (Teamwork, planning and organising, communication)
Performance Criteria	Develop optimisation plan taking account of hazards identified and HSE implications and communicate to appropriate personnel. (Initiative and enterprise, learning,communication, technology, problem solving, self management, teamwork)
Range Statement	This unit describes the work conducted by senior operators, team leaders or front line managers who optimise process systems as part of their work function. It includes all items of equipment and unit operations which form part of the production process of a complete area. (Teamwork, learning, problem solving, self management, technology)
Required Skills and Knowledge	Optimising process systems requires application of detailed operational and process knowledge to address issues (Learning, planning and organising, problem solving)
Evidence Guide	While the technician is expected to take a lead technical role, and to demonstrate competence as defined above, optimisation is rarely undertaken by an individual alone and liaison with all relevant stakeholders is an expected part of this competency. (Technology, learning, communication, teamwork)

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Industry Contextualisation

MSA07 – General advice for contextualisation

Competency units may, and in some cases should, be contextualised to the sub-sector and type of work environment involved. Contextualisation which:

- replaces general directions with enterprise specific needs
- replaces generic equipment/process names with enterprise specific names
- replaces general processes/specifications with enterprise specific needs

is allowed and encouraged, provided the contextualised unit is of similar level and rigour to the original competency unit.

Note that contextualising cannot be used to generate an additional competency which is closely related to an existing competency. Contextualisation can only be used to generate an alternative competency for qualifications purposes.

Contextualisation may only be done if it does not significantly change the level and rigour or change the application of the unit. Contextualisation may be done within the required knowledge, range of variables and the evidence guide. Lists in these sections should be regarded as indicative lists unless otherwise stated.

Note also that contextualisation of the elements or performance criteria is not permitted. As a minimum, the contextualised unit should:

- be of similar level and rigour
- be of a similar breadth, complexity and size
- be relevant to the industry sector and the enterprise
- not reduce the health, safety or environmental requirements
- retain the original unit code and title.

Importing units from other Training Packages

Competency units may be imported from another endorsed Training Package to customise a qualification. These imported units may be used to replace the maximum number of imported units that are identified in the packaging rules. The use of imported units is allowed if:

- they are from an endorsed Training Package and are packaged at the same AQF certificate level (the original unit title and code number must be retained)
- they are appropriate to the needs of the enterprise
- any prerequisites and co-requisites specified in the original unit and any specific assessment requirements in the host Training Package are also observed.

Exporting units to other Training Packages

Manufacturing Skills Australia encourages other industries and ISCs to access the units of competency in this Training Package which might be appropriate to their needs. These competencies may be used provided:

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- the original unit code and title are retained
- they are only contextualised to the extent permitted above
- any specified prerequisites and co-requisites and any specific assessment requirements in the host Training Package are observed

Manufacturing Skills Australia is advised of the specific competencies to be used to facilitate ongoing communication in the event of an update.

Appendix 1: MSA10107 Certificate I in Manufacturing (Pathways)

Research

The Certificate I in *Industry* (Pathways) developed out of research commissioned by the Australian National Training Authority and undertaken by Ratio Pty Ltd over the past three years. Initial research identified that a range of stakeholders considered that a mechanism was needed to:

- explicitly address Employability Skills as described in the report, *Employability Skills For the Future*, BCA/ACCI, 2002
- create pathways into further study, school continuation and/or employment for those for whom traditional pathways were not sufficient or accessible
- assist potential employees in making more informed choices about careers.

Phase One: 2002-2003

In summary, this stage of the research established two main points.

- Across the country a wide range of existing courses and programs sought to address these issues for equity groups which are not part of an industry Training Package and therefore the Australian Qualification Framework (AQF). They focused on the needs of the learners without providing the industry focus or achieving a nationally recognised qualification.
- Current Certificate I qualifications within Training Packages were largely generalist qualifications nestled in higher level qualifications which addressed some of the Employability Skills, but lacked a focus on technical skills. With some exceptions, they were not held in high regard by industry or RTOs.

This research recommended that a qualification be developed which is:

- a recognised qualification in a Training Package
- flexible across Training Packages
- delivered in a work context through one or more meaningful work activities.

It was anticipated that such a qualification would provide a bridge between learner needs and industry need.

Phase Two: 2004-2005

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The consultants, with the support of the State and Territory Training Authorities (STAs) and an industry reference group, worked with three Industry Skills Councils (ISCs) to develop a consistent yet customisable qualification.

The ISCs involved were:

Agri-Food Industry Skills Council
Manufacturing Skills Australia (MSA)
TDT Australia (Transport and Logistics).

Pathways qualification model

The qualification model developed was characterised by the following units of competency and structure.

- One core industry unit – this reflects a core industry activity or function and should be delivered as such, with a defined beginning, middle and end. This unit ensures that the qualification has a practical hands-on focus and provides an understanding of the industry.
- Three pathway units – these specifically address the Employability Skills and ideally should be delivered by clustering the units around the core industry unit.
- Two technical units – these provide the underpinning skills and knowledge for the core industry unit and provide articulation into higher industry qualifications.
- Up to three units from any Training Package – these provide the flexibility to cater to the needs of different learner groups, different employers and different contexts. For example, language and literacy units, units from other Training Packages or higher level units from Training Packages from within the same ISC.

Phase Three: 2005-2006

In this latest phase of the research the consultants were contracted to conduct a trial of the Pathways Certificate with a range of target groups in a range of contexts.

It was considered important to ensure that the qualification:

- was sound in structure and content so that it would be adopted across industry and valued by industry and the community
- was able to be implemented by the range of RTOs
- created meaningful pathways for the learners
- provided explicit learning in the Employability Skills.

Stakeholder consultations

Throughout the trial period there were ongoing consultations and discussions with the participating ISCs and STAs. Meetings with representatives from the relevant sections of the state training and education departments were organised to correspond with the site visits in each state.

Participating RTOs and programs delivered

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The trial deliberately set out to sample a range of RTO types across different states. The following RTOs participated.

State	**Industry**	**RTO Type**	**Name**
Victoria	Transport	Private	Banksia Consulting
New South Wales	Transport	TAFE School partnership	Hunter Institute of TAFE, Glendale Campus
Tasmania	Transport	Community owned not-for-profit Job Network provider	STEPS Education and Training Solutions
Tasmania	Agri-Food	TAFE	TAFE Tasmania, Launceston
Western Australia	Agri-Food	Residential Provider for youth at risk	Great Southern TAFE, Gnowangerup
Queensland	Agri-Food	TAFE	Brisbane TAFE
South Australia	Manufacturing	Industry/TAFE School partnership	TAFE SA Regency campus/Schefenacker Vision Systems*
South Australia	Manufacturing	TAFE	TAFE SA, Port Adelaide Campus
These RTOs are participating from February 2006 to be completed by June 2006			
Western Australia	Manufacturing	TAFE/School partner ship	Challenger TAFE with Warnbro High School
Northern Territory	Agri-Food	School	Taminmin High School, Humpty Doo

(*This trial was undertaken with Schefenacker Vision Systems providing industry experience for participants.)

Other consultations and presentations included:

- Equity advisors from each State and Territory
- CEOs of all of the ISCs
- Boards of Studies – Australian Curriculum Assessment and Certification Authority (ACACA), Victorian Curriculum and Assessment Authority (VCAA)
- Australian Chamber of Commerce and Industry (ACCI)

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- TAFE NSW International Centre for VET Teaching and Learning (ICVET)
- 2005 Connecting Access Workshop through TAFE NSW in Sydney
- Brian Cramond from DFEEST SA presented to the Australian Vocational Education Training Research Association (AVETRA)
- Andrew Nicholson from the trial site at Great Southern TAFE in WA presented to the Teen Teachers Forum.

Trial outcomes

The Pathways Certificate is a viable qualification within the Training Package framework. In terms of Training Package qualifications the Pathways Certificate is unique. It:

- is an industry-based qualification, but is not specific to one job outcome
- is preparatory, but combines a practical work activity
- explicitly addresses Employability Skills and technical skills
- is sufficiently flexible to address local needs, yet it has a common across industry structure
- has unique pathways units, but uses Training Package units thereby providing some articulation
- can be used for workforce entry and re-entry, or induction
- provides for participants needs but focuses on work readiness within one particular industry
- focuses on a pathway and the destination.

Because it is practical, work-based and industry-focused it is compatible with Training Package qualifications and is consistent with the AQF. It also is a very useful tool for industries to attract potential employees and give them credit into higher qualifications.

However, it is different in that it provides work readiness as opposed to job readiness, requires a particular training methodology, and is applicable across Training Packages within an ISC; therefore it requires a special status within Training Packages.

Each of the three trialed qualifications, ie the three qualifications covering Agri-Food, Manufacturing and Transport, shares the same structure, qualifications framework and pathways units. These aspects of the qualification have been thoroughly tested and endorsed by trainers, coordinators, ISC personnel and other industry personnel. Consistency in these matters is important for maintaining the quality, achieving the outcomes and marketing and branding.

Following conditional endorsement of the trialed qualifications, it was recommended that each of the 3 ISCs submit a Certificate I (Pathways) qualification for final endorsement, utilizing the three core Pathways units and drawing on industry specific units of competency from current Training Packages.

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Appendix 2: Development of the Process Manufacturing Certificates and generic manufacturing units

In Phase 1 of the review of the Plastics, Rubber and Cablemaking Training Package (PMB01), the production support certificates in PMA, PMB and PMC were reviewed to determine commonalities and potential for rationalisation. The review determined that, as there were minimal differences between the existing certificates, there would be considerable benefits to both industry and RTOs if the mandatory units and the production support certificates were generalised, for use across all three packages.

It was agreed that this work would be undertaken as part of the review of PMB01 and that the common certificates would be developed for inclusion in the Manufacturing Training Package (MSA07). These certificates will be available for use across the three process manufacturing Training Packages.

The existing production support certificates in PMB01 have not been carried forward to PMB07. As part of the current review of PMA and maintenance of PMC, it is intended that the production support certificates in these packages will also be replaced by the MSA Process Manufacturing certificates.

As part of the re-development work, Certificate III in Process Manufacturing has been reviewed to bring it into line with AQF descriptors. To address this need, which was identified by industry, RTOs and Government stakeholders, the mandatory (core) units have been altered and a requirement to attain competency in a minimum number of Certificate III units has been maintained. The focus of this certificate remains on addressing training needs of people whose job roles support the production process.

In addition, it was also recognised that there was significant duplication in the support units currently available at Certificates IV, Diplomas and Advanced Diplomas in PMA, PMB and PMC. A range of rationalised support units has been developed for use across the three packages. These units will be endorsed as free electives in MSA07, not aligned to any MSA qualifications at this time, but available for importation to PMA, PMB and PMC.

This project has been overseen by the PMB Project Reference Group and the Process Manufacturing Industry Advisory Committee. Consultations were undertaken in conjunction with the review of PMB01 and have involved the State/Territory ITAB and RTO networks.

Membership of the Project Reference Group

Organisation	**Nominee**	**Representing**

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PACIA NSW	Stephen Holland	Plastics
Viscount Plastics (Australia) P/L	Ian Kidd	Plastics industry
National Union of Workers	Julie Warren	Union
Assoc of Rotational Moulders A'sia	Leisa Donlan	Rotational moulding
Ai Group	John Quick	Plastics
Buchanan Advanced Composites	Norm Watt	Composites
TAFE NSW – MECATCC	Kim Peterson	Public provider – NSW
Kangan Batman Institute	Bill Rees	Public provider – Vic
Newskills Ltd	Stephen de Rozairo	Private provider – Vic
Applied Training Solutions	Carlo Lauricella	Private provider – NSW
OTTE	John Scott	State Government

Members of Process Manufacturing Industry Advisory Committee

Member	**Organisation**	**Representing**
David Graham	Huntsman Chemical Co (MSA Director)	PACIA (plastics and chemicals)
Doug Stevens	National Union of Workers (MSA Director)	NUW (plastics)
Julie Warren	National Union of Workers	NUW (plastics)
Brian Tobin	Readymix Beenleigh Quarry	Concrete Products (premix)
John Turton	Cement, Concrete and Aggregates Australia	CCAA (cement and concrete)
Don Sanders	Australian Petroleum Production and Exploration Assn Ltd	APPEA (hydrocarbons)
Leisa Donlan	Assoc of Rotational Moulders Australasia	ARMA (plastics)
Alan Bugg	Huntsman Chemical Co Aust Ltd	AWU (chemical)
Vince Lloyd	Qenos	AWU (chemical)
Chris Nail	Foseco Pty Ltd	Manufactured Mineral Products (Refractories)

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Norm Watt	Buchanan Advanced Composites	Composites Australia

Appendix 3: Background to the Competitive Manufacturing Qualifications

The Competitive Manufacturing Training Package was developed by the Competitive Manufacturing Initiative (CMI).

Overview of the CMI

The Competitive Manufacturing Initiative (CMI) was a collaborative response from Australia's Manufacturing Industry Training Advisory Bodies (ITABs) to assist manufacturing industry improve manufacturing practice through the development of innovative vocational education and training (VET) qualifications and units of competency. The CMI development process was funded by ANTA. The original scoping project for the CMI was majority funded by industry.

The following ITABs formed the Project Management Group for the initial development of the Competitive Manufacturing Training Package.

- **Automotive Training Australia** which covered:
  - passenger vehicles
  - trucks
  - bus and trailer manufacturing
  - most coach and body building
  - vehicle repair, service and retail
  - automotive after market, and
  - some component manufacturing.
- **Light Manufacturing Training Australia** which covered:
  - the textile clothing, footwear and leather industries. and
  - the furnishing industry.
- **Manufacturing Learning Australia** which covered process manufacturing industries such as:
  - chemical
  - hydrocarbons
  - oil
  - plastics
  - rubber
  - cablemaking

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- cement
- clay
- ceramic
- concrete
- refractories
- plaster, and
- fibre board.

- **Manufacturing Engineering and Related Services ITAB** which covered:
  - metal and engineering related manufacturing
  - heavy engineering
  - maintenance
  - aerospace, and
  - boating.
- **National Food Industry Training Council** which covered:
  - food and beverage
  - pharmaceutical, and
  - tobacco processing and manufacturing.

MERS ITAB acted as the secretariat for the development of Competitive Manufacturing. However, users should now contact Manufacturing Skills Australia (MSA), the national Industry Skills Council that covers manufacturing to seek specific advice relevant to their area. Contact MSA on telephone (02) 9955 5500 or at www.mskills.com.au. The CMI website should also be checked for information and advice at www.cmi.org.au.

Industry coverage

The Competitive Manufacturing qualifications cover all of the manufacturing industry. At the 2001 census, the manufacturing industry employed 1,010,179 persons or 12% of the entire workforce. Manufacturing is the biggest sector in terms of contribution to gross domestic product where it contributes 13 % of the total product[1] and is also the sector with the highest value added contributing 12% of the total value added[2] to the economy. The Australian Bureau of Statistics notes[3] that 'Manufacturing contributed more to Australian production than any other industry'.

1. Manufacturing Industry Australia, 1999-2000, ABS, 8221.0
2. Australian System of National Accounts, 2002-2003, ABS, 5204.0
3. Manufacturing Industry Australia, 1999-2000, ABS 8221.0

The CM qualifications are complementary to qualifications in existing Training Packages covering specific manufacturing sectors. These sector specific Training Packages cover the knowledge and skills specifically required by those sectors. The CM qualifications cover knowledge and skills associated with manufacturing practices and systems which are common across manufacturing sectors.

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Development of the Competitive Manufacturing qualifications

This project originated out of discussions within the Board of the Foundation for Australian Manufacturing Education (FAME) and the initial scoping study was financially supported by FAME, Australian Business Ltd and ANTA. Support for the project's aims and objectives was also given by the Australian Manufacturing Centre (AMC) and the Australian Industry Group. This scoping project found that there was a bias in the then existing Training Packages of specific technical skills and insufficient coverage of the skills needed to manage, supervise and implement system skills needed in modern manufacturing. The scoping report identified a need for the development of units of competency in manufacturing practice, and possibly also qualifications in manufacturing practice.

The CMI Stage 2 project:

- investigated the scope of skills to be included in the CMI
- developed a marketing strategy and established a CMI website
- established a formal cooperative mechanism amongst the manufacturing ITABs
- established a brand and logo based on the title Competitive Manufacturing Initiative (CMI).

The CMI Stage 3 project then developed and validated a number of units of competency and qualifications. The development and validation was done by consulting industry generally and also by the use of industry experts. Care was taken through this process to ensure there was representation of each industry sector and type of manufacturing process. The use of competitive manufacturing practices is variable across the manufacturing sector, and one of the aims of developing this Training Package is to make training in these skills more widely available, so helping industry operate more effectively in a competitive environment. Initial consultation therefore focussed more on identified leaders in this area while validation focused more on the broader manufacturing industry.

Consultations undertaken as part of CMI Stage 2 and confirmed in Stage 3 indicated that the CM qualifications and units would represent new content for many RTOs and that many of the skills could only be taught and assessed in a workplace environment. CMI Stage 3 therefore included a process to allow early identification of delivery issues through a trial site process. Five trial sites were selected to cover both a number of states and also each major industry sector. The trial sites used[4] the draft CM units to map the draft units to current delivery and to validate the units and to determine any delivery issues. The trial sites were:

- Goulburn Ovens Institute of TAFE – Shepparton Campus
- Hunter Institute of Technology
- Onkaparinga Institute of TAFE
- Swinburne University – VET Division
- Western Sydney Institute of TAFE – Mt Druitt Campus

[4] As the units were not endorsed at this stage there were some practical limitations on the 'use' of these units.

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The Technology Cadetships

In August 2003 the Australian Industry Group with funding assistance from ANTA established a Manufacturing Technician Training Initiative project known colloquially as the Technology Cadetship Project. The aim of the project was to develop and promote more efficient pathways for school leavers to enter technical occupations in manufacturing industry. One of the key objectives was to establish entry level qualifications linked to on and off the job training in a cadetship arrangement.

The origin of the project was partly Australian Industry Group work on the National Industry Skills Initiative as well as comments and concerns by Ai Group members that pathways for the development of technician level skills in manufacturing were inefficient and generally took too long to be attractive to either enterprises or young people.

The Ai Group Manufacturing Technician Training Initiative included activities in a number of areas that were broader than a normal Training Package development project. These areas were:

- Identification and/or development of appropriate content in existing and/or new Training Packages;
- Marketing of technician level contract of employment arrangements to employers, young people, industry and the community generally;
- Establishment of appropriate employment arrangements;
- Establishing arrangements for the approval of contracts of employment by State Training Agencies
- Establishment of appropriate funding arrangements for both mainstream training delivery and employer financial incentives;
- Marketing of actual placements to Ai Group members and other employers.

While the Australian Industry Group conducted much of the content research and development for this submission, both the Ai Group and ANTA realised that Ai Group would not be able to put forward the new qualifications for endorsement under current policy arrangements.

The Australian Industry Group was consulted on the development of the Competitive Manufacturing Training Package and decided that the CM was the most appropriate body to take over on a longer term basis the future content development of the Technology Cadetship and responsibility for endorsement of the work done to date. The CMI ITABs and Ai Group also agreed that the qualifications and units for the Technology Cadetship should be part of the responsibilities of the Manufacturing Industry Skills Council once it was established.

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The Manufacturing Industry Skills Council has now been established and it is anticipated that the Competitive Manufacturing Initiative will continue to exist as a sub committee function in the Manufacturing Skills Council and that arrangements will be made for on going participation of the Agri-Foods Skills Council and for automotive industry representation.

The term Technology Cadetship was developed to differentiate the level of training from that commonly found in apprenticeships and traineeships although the principle of combined off and on the training and mutual obligation of employer and employee is the same.

Appendix 4: Technology Cadetship – metallurgy and polymer technology streams

MSA07v3 Manufacturing Technology qualifications – metallurgy and polymer technology specialist streams

The previous Certificate III in Manufacturing Technology and the Certificate IV in Manufacturing Technology provided four specialist streams. These were:

- CAD/drafting
- Manufacturing operations
- Technical Officer
- Laboratory operations

The new polymer technology stream will provide new specialisations within both qualifications. The metallurgy stream will provide a specialisation within the Certificate III. Industry advises there is no work outcome at Certificate IV.

In addition, metallurgy and polymer technology specialist streams have been developed at the Diploma and Advanced Diploma levels, hence two new qualifications (Diploma and Advanced Diploma in Manufacturing Technology) are also part of this endorsement submission. These are the first streams for the Diploma and Advanced Diploma qualification levels to be completed. Other industry specialisations for these qualifications are under development by Manufacturing Skills Australia (MSA).

Background to the Technology Cadetships

The new streams, like all existing streams for the Certificate III and IV in Manufacturing Technology, have been developed to be undertaken as part of an entry level qualification linked to on and off the job training in a cadetship arrangement known colloquially as a *technology cadetship*. The term *technology cadetship* was developed to differentiate the level of training from that commonly found in apprenticeships and traineeships, although the principle of combined off and on the job training, a formal contract of training and mutual obligation of employer and employee is the same. As in apprenticeships and traineeships the qualifications have a separate title from that used for the cadetship.

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Employment arrangements for students of the metallurgy or polymer technology specialisations can vary according to the circumstances of each student. It is anticipated that most students will be undertaking a technology cadetship which will be supported by Award, enterprise agreement or Australian Workplace Agreement employment arrangements. A special Award for the employment of Technology Cadets was created by consent between the Australian Industry Group, the Engineering Employers Association South Australia, the Australian Manufacturing Workers Union and the Australian Workers Union. This Award is known as the *Manufacturing And Associated Industries – Skills Development - Wages And Conditions Award 2004*.

Project Management

Development of the metallurgy and polymer technology streams was part of a broader project known as the Competitive Manufacturing Initiative (CMI) Stage 5. This project included development of additional specialisations for the Technology Cadetships as well as development of a new school subject in manufacturing studies for higher achieving year 11 and 12 school students.

CMI Stage 5 was conducted under the oversight of the Strategic Manufacturing Initiatives Industry Advisory Committee of the Manufacturing Skills Australia Board.

Strategic Manufacturing Initiatives IAC membership

Ian Curry MSA Director	National Projects Officer Australian Manufacturing Worker's Union
David Graham MSA Director	Learning & Development Manager Huntsman Chemical Company
Michael Grogan MSA Director	Chief Executive Officer Sutton Tools
Martin Lewis MSA Alternate Director	Chief Executive Officer Furnishing Industry Association of Australia
Megan Lilly MSA Director	Associate Director – Education & Training Australian Industry Group
Matt Murphy MSA Director	Communications, Electrical, Plumbing Union

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Day to day supervision of the CMI Stage 5 project was delegated to Bob Paton CEO and Sue Woodward Deputy CEO of MSA.

Richard Jenkins and Associates were contracted to undertake this work. Consultants who worked on the project were Richard Jenkins, Kevin Hummel and Kerrie Clarke.

Metallurgy stream

Metallurgists can be degree qualified or have qualifications issued through the vocational training and education sector. Metallurgists work across manufacturing in a number of sectors and roles. Sectors include:

- processing of ores and refining and smelting of metals;
- foundries;
- diecasting;
- steel making
- fabrication and welding of structures;
- metal protection and corrosion control.

Metallurgists are involved in the specification and supervision of the processing of metallic ores as well as metal smelting, refining, melting, pouring, joining, fabricating and finishing processes. Metallurgists working in the mining and processing of metallic ores are often called primary metallurgists while metallurgists specifying and supervising producing metal or metal products are often called industrial or secondary metallurgists. Primary metallurgists generally though not exclusively are degree qualified while secondary metallurgists can be either VTE or degree qualified. Because of the low demand for VTE primary metallurgists this pathway and submission concentrates on skills required for secondary metallurgists.

The metallurgy stream development process involved:

- initial separate approaches by the Australian Foundry Institute and Central TAFE in Western Australia to MSA for the development of metallurgy qualifications. After considering these requests MSA decided that the best approach would be to develop qualifications and units of competency as part of the Manufacturing Technology qualifications allied with the Technology Cadetship initiative as this would allow the widest coverage across manufacturing and also facilitate entry level training. It was also envisaged that the metallurgy units of competency that were to be developed would be imported into the Metal and Engineering Training Package after endorsement to enhance the range of electives available in the Diploma of Engineering –Technical and Advanced Diploma of Engineering qualifications in that Training Package.
- consultation with enterprises, industry organisations and RTOs to confirm support for the proposed stream. Consultations were both face to face and by telephone.

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- a review of existing endorsed units of competency for relevance to the metallurgy stream. While a range of units relevant to metallurgy were identified, these were mostly of a supporting nature. The review found that most metallurgy related skills would need to be covered by new units of competency.
- visits to foundries in several States and to steelmaking plants in Newcastle and Wollongong to meet with metallurgists and to observe first hand their duties and work environment
- development of draft units of competency and a specialist stream qualification structure within the existing manufacturing technology qualifications. Employability skills were embedded in all new units of competency.
- preparation and distribution of first, second and final drafts for industry and RTO comment and review.

Consultations

The development of the metallurgy units and associated units of competence involved substantial industry and RTO contributions. Special mention needs to be made of the support and assistance provided by the Australian Foundry Institute, Central TAFE in Perth, Hunter Institute of Technology and Bluescope Steel.

The Australian Foundry Institute delegated its Queensland Branch to form a sub–committee especially to liaise with and assist the project consultant. This sub-committee facilitated access to workplaces and met with the project consultant numerous times to provide technical information and to review drafts.

Central TAFE in Western Australia and the Hunter Institute of Technology in Newcastle provided full access to their current State accredited metallurgy qualifications and hosted several visits by the project consultant. Central TAFE also conducted surveys of WA industry to obtain comments on the draft pathway and units of competence.

Bluescope Steel provided access on a commercial in confidence basis to several internal DACUM analyses and job descriptions for metallurgists. As well Bluescope hosted several plant visits by the project consultants.

Drafts of the metallurgy stream and units of competence were distributed to major enterprises, industry associations, relevant unions, major RTOs and State ITAB contacts. Besides the general distribution to the above organisations, a range of selected individuals in each organisation were also contacted.

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Many of these organisations also passed on the drafts through their own networks. For example the Australian Industry Group advised that the drafts had been distributed to their network of industry training advisors who in turn distributed them to interested members. A list of individuals contacted directly for consultations and/or distribution of draft pathways and units follows.

Megan Lilly, Australian Industry Group (plus all Ai Group Training Advisers)

Ian Curry, AMWU

Margie John, SA TAFE

Deb Doherty, Office of Post-Compulsory Education & Training, Tasmania

Remy Jayasekere, Central TAFE, WA

Bruce Wilson, Central TAFE, WA

Stephen Davies, NSW TAFE MEC&T Curriculum Centre

Paul Kennett, Manufacturing and Engineering Skills Advisory Body of Victoria

Sue Fraser, EEASA Group Training SA

Simon Kay, Toowoomba Metal Technologies

Richard Bozza, Toowoomba Metal Technologies

Michael Wright, Bradken Runcorn Foundry Queensland

Greg Newton, Bradken Runcorn Foundry Queensland

Stojan Lemut, Bradken Henderson Foundry Western Australia

Craig Lee, Bradken Henderson Foundry Western Australia

John Elliot, White Industries Dalby Queensland

Bob Murray, Wear Tech Foundry Queensland

John Walter, Investment Castings Queensland

Rod Brown, Austcast Queensland

Michael Lee, CAST CRC Melbourne

Chris Shaw, Queensland Railways Redbank Foundry

Ken Nicholl, Hunter Institute of Technology

Karen Humphreys, Hunter Institute of Technology

Scott Orpin, OneSteel Newcastle

Steve Dowey, Surface Technology Coatings and Suttons Tools Melbourne

Derry Doyle, Surface Technology Coatings and Suttons Tools Melbourne

Phillip Rouse, BlueScope Steel Port Kembla

Stephen Irving, BlueScope Steel Port Kembla

Max Voight, PAC Foundry Pty Ltd, Queensland

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John Cawley, Swinburne University Centre for New Manufacturing

Brad Walsh, Dickinson's Metallurgical Supplies, South Australia

Shelley Smailes, METS CSSN Portfolio Officer, WA TAFE

Marty Burgess, Illawarra Institute of TAFE NSW

David Tiller, Australian Industry Group NSW

Ewan O'Leary, Weir Minerals Sydney

In addition to the above direct consultations the Australian Foundry Institute distributed draft copies of the units and qualifications to their members in all States and Territories. Support for the drafts was received from each Branch of the AFI.

There was substantial enthusiasm and support for the development and endorsement of the metallurgy pathway from all individuals and organisations consulted.

Polymer technology stream

The polymer technology stream covers technician level skills required by the plastics, rubber and cablemaking industries. **These industries employ a**pproximately 48,000 people and consist of:

- plastics - including injection moulding, blow moulding, blown film, rotational moulding, fabrication, composites, compounding and reclamation, extrusion and thermoforming
- rubber - including belt splicing, extrusion, rubber lining, tyre building and tyre retreading
- cablemaking - including power transmission and communication cables.

The Polymer Technology stream is intended for people who plan to become polymer technicians, and who are not currently working as operators in the polymer industries. It is recommended that those who have already achieved a Certificate II from the Plastics, Rubber and Cablemaking Training Package would be better served by completing the Certificate III in Polymer Processing.

The polymer technology stream development process used the same basic processes for development as was used for the development of the existing endorsed specialist streams. This involved:

- initial consultation with industry and RTO to re-confirm support for the proposed pathway. Initial support had been identified in the Technology Cadetship Expansion Scoping Study report by MSA in April 2005.
- review of existing endorsed units for relevance to the polymer technology stream.
- identification of gaps and writing of new units of competency to meet these gaps
- development of a specialist stream for the existing manufacturing technology qualifications

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- preparation of first, second and final drafts for industry and RTO comment and review.

The early consultations indicted continuing support and enthusiasm for the development of a polymer technology stream for Technology Cadetship related qualifications.

After confirming continuing support, currently endorsed units were evaluated for relevance to the proposed polymer technology stream. The two main Training Packages examined were the Plastics, Rubber & Cablemaking Training Package (PMB01) and the Competitive Manufacturing Training Package (MCM04). This examination revealed that most units required for the stream were already endorsed. A need for six new polymer technology units was identified. In addition there was support for incorporation of three generic sustainability units because of the importance of environmental and sustainability issues to the plastics, rubber and cablemaking industries.

Discussions were also held with MSA staff and consultants involved in the review of the Plastics, Rubber & Cablemaking Training Package (PMB01) to ensure that there was co-ordination between the two projects. New units developed as part of the polymer technology pathway have been coded as PMB units and have been incorporated into PMB07 which was endorsed on 16/11/07.

Consultations

Drafts of the polymer technology stream and units of competence were distributed to major enterprises, industry associations, relevant unions, State Training Authorities, major RTOs and State ITAB contacts. Besides the general distribution to the above organisations, a range of selected individuals in each organisation were also contacted.

Many of these organisations also passed on the drafts through their own networks. For example the Australian Industry Group advised that the drafts had been distributed to their network of industry training advisors who in turn distributed them to interested members. A list of individuals contacted for consultations and/or distribution of draft pathways and units follows.

Alistair Martin, Vinidex WA

Ian Kidd, Viscount Plastics, Perth

Stephen Holland, Plastics and Chemicals Industries Association (PACIA)

Leisa Donlan, Association of Rotational Moulders Australia, Brisbane

Gary Rayner, Schefenacker Vision Systems

Roger Cater, Plastics and Rubber Technical Educational Centre (PARTEC) Qld

Barry De Sylva, PARTEC, Brisbane

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Sue Fraser, EEASA Group Training SA

Megan Lilly, Australian Industry Group (plus all Ai Group Training Advisers)

Ian Curry, AMWU

Doug Stevens, National Union of Workers

Julie Warren, National Union of Workers

Margie Johns, SA TAFE

Deb Doherty, Office of Post-Compulsory Education & Training, Tasmania

Larry Taylor, TAFE Tasmania

Peter Ebel, Central TAFE, WA

Graham Walsh, JAG Assignments (VET consultant in Tasmania)

David McIntee, Northern Group Training Company, Tasmania

Kim Peterson, NSW TAFE MEC&T Curriculum Centre

Leslie Faulstone, NSW TAFE

Stephen Dawkins, NSW TAFE

Peter Harper, NSW TAFE

Bill Brees, Kangan Batman Institute of TAFE

John Molenaar, Manufacturing and Engineering Skills Advisory Body of Victoria

Stephen De Rozairo, Newskills (RTO) Melbourne,

Carlo Lauricella, Applied Training Solutions (RTO), Sydney,

John Quick, AiGroup, Sydney

John Scott, OTTE, Melbourne,

Trevor Lange, Curriculum Maintenance Manager, Chisholm Institute of TAFE

Appendix 5: Technology Cadetship – structural steel detailing stream

MSA07v3.1 – Manufacturing Technology - new structural steel detailing specialist stream

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Project background

Structural steel detailing involves taking a design for a steel structure such as a steel framed building prepared by an engineer or architect and transforming it into a series of complete working drawings and erection diagrams for use by steel fabricators and builders. In preparing the drawings steel detailers are often required to liaise with engineers, architects, design draftspersons, fabricators and builders. The steel detailer is required to create drawings for all components of a steel structure including all welded and bolted connections. The work of the steel detailer is critical as they produce all the detailed instructions that enable both fabrication and construction to occur. Structural steel detailing enterprises are usually small with a range from single person businesses to 15-20 employees. There are a small number of larger structural steel detailing enterprises and an unknown number structural steel detailers also work for large builders and fabricators.

Structural steel detailing has been covered by a single specialist unit in the Metal and Engineering Training Package for approximately ten years since the first endorsement of MEM98. However as shortages of steel detailers became more apparent, industry dissatisfaction with this minimal coverage grew and MSA was approached on a sporadic basis by different enterprises and state steel detailing associations for greater coverage of steel detailing skills.

In February 2007 Manufacturing Skills Australia was approached by the Australian Steel Institute (ASI) with an offer to co-ordinate a national input and participation in the development of Training Package based qualifications in structural steel detailing. MSA accepted this offer and an industry based Steering Committee was formed chaired by an ASI senior officer. Richard Jenkins and Associates was also engaged at this time to undertake the research and development of the appropriate qualifications.

Meeting industry needs

Initial industry consultations indicated that there was significant industry interest in developing qualifications that could be used to attract young people into steel detailing as well as support training for people who were currently in employment but looking to change careers and train in steel detailing. It was decided that industry requirements could best be met through developing a structural steel detailing specialist stream in the existing Manufacturing Technology qualifications in the Manufacturing Training Package. This would allow training to be linked Technology Cadetships and to apply across all of MSA’s coverage. This decision was supported by the Steering Committee, industry associations and the AMWU which is the relevant union.

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The new units and qualifications have full support of the industry. During the course of development, pre-existing State based Steel Detailing Institutes combined to form a national federation called the Australian Institute of Steel Detailing. The AISD and all State Institutes have indicated support for the draft specialist stream and units of competence. The development of the new specialist stream is also consistent with the MSA aim identified in the MSA Environmental Scan to to lift overall educational achievement levels in areas of MSA coverage.

Development has drawn on the experience and expertise of the Australian Steel Institute, industry and RTOs to make sure that the proposed specialist stream will meet training and assessment requirements well into the future.

Project management

The project was managed by Manufacturing Skills Australia and overseen by a seven person industry based Steering Committee. Apart from an ASI nominee, other members represented industry in NSW, Victoria and Tasmania, South Australia, Queensland, and Western Australia.

The Steering Committee's functions were to:

- oversee and advise on consultation processes
- provide advice on underpinning knowledge and technical content
- act as a technical advisory group in the development of new units of competency
- assist with the resolution of any issues.

The Steering Committee members are listed below.

Name	**Organisation**	**Representing**
Peter Hisco (Chair)	Fiddlistics Pty. Ltd.	Victorian Institute of Steel Detailers
Chris Velovski	EDC. Pty. Ltd.	NSW Institute of Steel Detailers
Clayton Roxborough	SteelCad Drafting Pty. Ltd.	Queensland Institute of Steel Detailers
Neil Creek	Australian Steel Institute	Australian Steel Institute
James Galdes	Ironworks Steel Detailing	Victorian Institute of Steel Detailers

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John Lyons	PDC Consultants	WA Association of Engineering Drafting Services
Greg Hammer	Australian Steel Detailers	Association of Independent Structural Draftsmen of SA

Consultation and validation processes

Consultations were undertaken nationally, involving face to face meetings, targeted email distribution of drafts to stakeholders (including members of the State industry associations, the AMWU, RTOs, State/Territory ITBs, STAs and individual enterprises) and wider distribution via the MSA website and the MSkills email update. Individual consultations with both enterprises were also conducted to confirm content and approach. Consultations were also undertaken with a range of RTOs in each State that were considered likely to be interested in delivery of structural steel detailing. While all RTOs consulted were supportive of the drafts, because of the small and highly specialised nature of structural steel detailing not all were interested in delivery.

Following a period of public comment, final drafts were developed, distributed by email and made available for a sign-off period on the MSA website. The qualifications and units of competency now being submitted have the full support of industry and interested RTOs.

Many people made time from their work commitments to participate in this project especially the members of the Steering Committee and John Leworthy from the VISD who also provided technical input. Without their expertise and input, the project would not have been able to achieve its objectives and this is gratefully acknowledged.

Structural steel detailing – consultation list

Development of the structural steel detailing specialist stream and associated units of competency involved substantial industry and RTO contributions. This included input from the following people.

Name	**Organisation**
Peter Hisco (Chair)	Fiddlistics Pty. Ltd.
Chris Velovski	EDC. Pty. Ltd.
Clayton Roxborough	SteelCad Drafting Pty. Ltd.
Neil Creek	Australian Steel Institute

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Name	**Organisation**
James Galdes	Ironworks Steel Detailing
John Lyons	PDC Consultants
Greg Hammer	Australian Steel Detailers
Ian Curry	AMWU
Anne Donellan	AMWU
Ian Anderson	RMB Metalwork
Ian Cairns	Australian Steel Institute
Lorraine Conetta	Bayside Drafting
David White	Box Hill Institute
John Leworthy	Steelcode Detailing
Dean Beaumont	Global Drafting Corporation
Stuart Mattingley	Box Hill Institute
Ricky Hains	PlanIT Design
John Neal	Warradale Drafting Service P/L
Philip Scrivener	Scrivener Drafting Australia Pty Ltd
Norm Batterham	NB Drafting
Craig Beams,	Beamarr Structural Steel Detailing Pty Ltd
John Robinson	Sole trader WA
Mark Selby	Amalgamated Drafting
Terry Bownes	Amalgamated Drafting
Fraser Nelson	MECAT Curriculum Centre. NSW TAFE
Stephen Davies	MECAT Curriculum Centre NSW TAFE
Klaus Bienert	Box Hill Institute of TAFE
Glen Miller	GFC Industries Pty Ltd (Steel Fabricator)

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Name	**Organisation**
Greg Schofield	Greg Schofield & Associates
Basil Morin	Global Drafting corporation
Robert Squires	TAFE Tasmania
Ian McDonald	Challenger TAFE
Greg Guppy	Challenger TAFE
Werner Lausberg	Adelaide North Institute of TAFE
Emmanuel Evangelidis	Victoria University
David Zanich	Central TAFE
Phil Grafton	Siegraft Drafting

The final drafts of the new units and qualifications were validated and signed off by all major stakeholders (both industry and RTOs) with no outstanding or unresolved issues. Validation and acceptance of final drafts was undertaken by email.

Formal support (letters/emails) has been provided by:

- AMWU
- Robert Squires TAFE Tasmania
- MECAT NSW TAFE
- Victoria University
- Klaus Bienert CMM Victoria
- Challenger TAFE
- Australian Institute of Steel Detailers
- Queensland Institute of Steel Detailing
- NSW Institute of Steel Detailing
- Victorian Institute of Steel Detailing (The Victorian Institute also covers steel detailers working in Tasmania)
- Association of Independent Structural Draftsmen of SA
- WA Association of Engineering Drafting Services
- Australian Steel Institute
-

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Appendix 6: Competitive Manufacturing Vocational Graduate qualifications

Development of Competitive Manufacturing Vocational Graduate qualifications

The need for development of Vocational Graduate qualifications in Competitive Manufacturing was identified by MSA in 2007 in response to requests for more in depth training and professional development for individuals who already had some skills or training in Competitive Manufacturing practices. MSA appointed Richard Jenkins & Associates to undertake the development of the qualifications with the project commencing in April 2007.

The MSA decision to provide professional development as the target approach for the graduate qualifications meant that it was also appropriate to shift the skill level of the new units of competency further towards the leading edge of competitive manufacturing practice. Identifying this leading edge was undertaken through desk research, individual consultation with enterprises and through a full day workshop with senior industry practitioners and one RTO representative who had very recent senior management experience in private industry in lean manufacturing.

The desk research and the industry workshop identified that the skills focus in the vocational graduate qualifications should not be on providing initial training in the competitive manufacturing "tools" such as Just in Time, 5S, preventative maintenance etc, whether at implementation (AQF III/IV) or initial system design (AQF V /VI). It was felt that these skills were already adequately covered in the existing Competitive Manufacturing qualifications. Rather it was felt that the emphasis should be on providing the skills for a practitioner to assist an enterprise to take existing competitive manufacturing systems to even higher levels of performance. This approach was seen to be consistent with:

- the professional development philosophy established by MSA for the Vocational Graduate qualifications in Competitive Manufacturing; and with
- industry need for the highest level of skills required to take existing enterprise performance to higher levels to address intractable problems.

Based on the advice of the workshop participants it was decided that the emphasis in the Vocational Graduate qualifications should be mostly focused in two areas:

- skills associated with improving workplace understanding and implementation of competitive manufacturing practices;
- skills associated with improving the performance of a value chain as distinct from a focus just within an enterprise.

The above approach was confirmed during both rounds of consultations with no dissenting views being received.

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Industry priorities addressed in the new components of the MSA07 Training Package Training Package are to provide additional development of skills and knowledge in competitive manufacturing practices for individuals who have prior training or industry experience in competitive manufacturing. This need for additional skill is usually apparent after an enterprise has completed initial implementation of a competitive manufacturing system such as lean manufacturing and needs to progress implantation of the system to a higher level of performance beyond that achieved from the initial implementation.

The development of the Vocational Graduate Competitive Manufacturing qualifications also is also a response to industry advice that not all needs for increased competency in competitive manufacturing skills is related to promotion of an individual to a position of increased responsibility. As stated in the previous paragraph the demand for increased skill and knowledge can also be related to the stage of an enterprise's implementation of a competitive manufacturing system

The Vocational Graduate Competitive Manufacturing qualifications also meet the industry need for in depth competitive manufacturing training in skills associated with establishing workforce understanding and participation in competitive manufacturing and for advanced value chain skills.

Meeting industry needs

The existing Competitive Manufacturing qualifications as they provide formal training and recognition for skills that have long been implemented in industry under various manufacturing practice approaches such as lean manufacturing, agile manufacturing, six sigma, total productive maintenance, etc. The current qualifications cover competitive manufacturing skills across the AQF II – AQF VI range and target training for operators, tradespersons, technicians, team leaders, supervisors and managers.

As implementation of the current qualifications proceeded it became recognised that while they provided a pathway for skills development to match promotion through a supervisory pathway, they did not provide as good an opportunity for someone who was already familiar with competitive manufacturing and who wanted to increase their skills and knowledge from their current level without changing their position within the enterprise.

The qualifications now being submitted for endorsement meet this need. They also meet the need of industry in that the early gains made from the implementation of competitive manufacturing practices are often the "low hanging fruit" of obvious errors and waste, and greater skill and knowledge is needed to sustain early gains and to achieve even higher performance levels.

Specifically based on the advice of the workshop and consultations, industry needs identified and addressed in this project focused on the following key skill areas:

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- culture
  - achieving a consistent approach to all of the business (i.e. the value chain)
  - problem recognition and resolution (including the customer's problems)
  - establishing a learning organisation
- relationships
  - internal relationships with employees e.g. trust, consensus decision making
  - external relationships with value chain members
  - developing the capability of people

The new components presented for endorsement have been developed and validated extensively with industry and RTO representatives. This includes representation from enterprises, industry associations, unions, and RTOs from around Australia.

Project management

Because this project has application across all of manufacturing it was directly overseen by the MSA Board. Advice from an industry technical advisory group made up of technical experts in competitive manufacturing practices was also sought at different stages.

The individuals and enterprises/organisations represented on the MSA Board are set out in the following table:

Name	**Enterprise/Organisation**
Megan Lilly	Associate Director, Education & Training Australian Industry Group
Ian Curry	National Projects Officer Australian Manufacturing Workers Union
Sam Wood	National Vice President Australian Workers Union
David Graham	Operations Learning & Development Manager Huntsman Chemical Co Australia Ltd
Doug Stevens	Central Branch Secretary National Union of Workers
Michael Brown	General Manager, Heavy Maintenance Qantas Airways

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David Hoare	General Manager Sealy of Australia
Michael Grogan	Chief Executive Officer Sutton Tools Pty Ltd
Michael O'Neill	National Secretary TCFU
Jo-Ann Kellock	Executive Director TFIA
Les Chegwidden	Manager Human Resources Viridian CSR

Consultation and validation processes

This project was conducted in two stages. An initial investigation stage was conducted to examine current research and Training Package components and included the initial scoping workshop. This was followed by an implementation stage involving widespread consultation and industry visits, development and validation of two drafts and preparation of a final draft for endorsement.

Consultations were undertaken nationally and involved face to face meetings and targeted email distribution of drafts to enterprises, industry associations, unions, RTOs, State/Territory ITABs, and STAs. Wider distribution was achieved via the MSA website and their regular email newsletter.

Following each period of public comment, amendments were made and drafts circulated for acceptance.

The following people were involved in the development process and the value of their expertise and input is gratefully acknowledged.

Name	**Organisation**
Keith Cowlishaw	Ex - General Manager Rocklea Spinning Mills Currently Head of School of Fashion and Textiles RMIT Melbourne

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Name	**Organisation**
Professor David Ben-Tovim	Flinders Medical Centre
Dr. Ross Bensley	Organisation Development Manager Schefenacker Vision Systems Australia
David Hind	Retired CEO, BOC Australia & Chair of Skills Tasmania
Aimee Allen	President - Strip and Plate, Port Kembla Steelworks Bluescope Steel
Rod Snashall	Slabmaking Process Control Manager, Port Kembla Steelworks Bluescope Steel
Michael Brown	General Manager, Heavy Maintenance and Technical Training QANTAS (Melbourne)
Jorge Marquesini	CEO Volvo Trucks Australia
Barry McCarthy	Learning and Development, Toyota Australia
Tari Shabat	Toyota Australia
Ray Clark	Corporate Learning and Development Associate Ford Australia
Julie Eastman	Corporate Learning and Development Manager Ford Australia
Michael Grogan	CEO, Sutton Tools Australia
Anne Donellan	Technical, Supervisory and Administrative Division Australian Manufacturing Workers' Union
Ian Curry	Australian Manufacturing Workers' Union
Steve Gunn	CEO, Blundstone Australia Pty Ltd
David Hoare	General Manager, Sealy of Australia
Doug Stevens	Central Branch Secretary, National Union of Workers
Michael Littlechild	Automotive Training Australia

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Name	**Organisation**
Anne Ford	TAFE NSW - Western Sydney Institute
David Tiller	Australian Industry Group
Bob Carter	General Manager, Improve group
Terry Richards	CEO, Australian College of Training
Joe Husidic	Wiseman Institute of Applied Learning
Allan McCracken	Forest Industries Training and Education Council (NZ)
Jennis Lawrence	Competenz New Zealand
Eric Salonen Richard Lindner	Manufacturing Skills QLD
Derek Cupp	Manufacturing Industry Skills Advisory Council (SA)
Jillian Dielesen	Light Manufacturing ITC (WA)
Archie Wright	MITAC (NT)
Les Hewett	Efficiency Works
Deb Doherty	Skills Tasmania
Steve Ghost	Skills Tech Australia (QLD)
Elizabeth Owers	DFEEST (SA)
Pauline Hart	MECAT TAFE NSW
David McCourt	TAFE NSW Riverina Institute
David Zanich	Central TAFE WA
Karen Humphreys	Hunter Institute of Technology (NSW)
Sandy Powell	Goulburn Ovens Institute of TAFE
Carlo de Martinis	Swinburne University – TAFE Division
Nick Proferes	TAFE SA
Kerry Dickson	TexSkill

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Name	Organisation
Martin Lewis	FIAA Ltd.
Geoff Adams	QLD Department of Tourism, Regional Development and Industry
Paul Kennett	Manufacturing and Engineering Skills Advisory Board (MESAB) Victoria
Robert Miley	Department of Economic Development, Tasmania
Werner Lausberg	TAFE SA

Appendix 7: MSA30309 Certificate III in Surface Coating Preparation and Application

Development of MSA30309 Certificate III in Surface Preparation and Coating Application

This new qualification meets an industry need to have qualified operators who can suitably prepare surfaces and apply the required protective coating. There currently exist qualifications for vehicle painters and painters and decorators, but there is no qualification in this sector for a job with arguably more technical requirements.

The CSIRO estimates the cost of corrosion in Australia to be around $13 billion per year. The major role for this sector is the control of corrosion and so, the reduction of this significant cost. Protective coatings need to be applied to much of public infrastructure (e.g. bridges, pipelines), some modes of transport (e.g. ships, submarines), and many large public and private structures (e.g. hydrocarbon, chemical plants, off shore oil/gas platforms). All these items need to have their surfaces prepared correctly before beginning to apply the appropriate coating. Time between preparation and application is often critical to the overall success of the final product. The industry sought an appropriate qualification to provide common and adequate base level skills across Australasia as a fundamental way of achieving better quality.

The increasingly technical nature of the protective coating and the need to undertake both adequate preparation and surface preparation safely and in an environmentally friendly manner has increased the need for this particular qualification. These technological advances have increased the life of the item, and the period between maintenance and the overall life. However, as surface preparation and coating becomes more technical, the ability to perform both correctly becomes more critical if the intended protection is to be achieved.

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As much of this work is done 'on site' with routine only supervision, it is essential that the qualification equips the operator for this degree of independent operation.

Project management

MSA's Process Manufacturing Board Sub-committee oversaw the development process with significant technical assistance being provided by the Australasian Corrosion Association (ACA) Technical Coatings Technical Group (TCTG).

The individuals and enterprises/organisations represented on the Process Manufacturing Board Sub-committee are set out in the following table:

Name	**Enterprise/organisation**
Les Chegwidden, Chair replaced by David Graham	Pilkington/Veridian Glass Huntsman Chemicals
Bob Paton or Barbara Wallace	MSA CEO MSA QA Manager
Julie Keddie	MSA Industry Coordinator
John Maraz	MSA Industry Coordinator
Robert McRuvie	DTRDI, Queensland
Alexsander Stanojevic	AiGroup
Richard Lindner	MSQ
Heather Yerbury	Boral Concrete & Quarries Country (QLD/NT)
Dr. Geoffrey Will	School of Physical Sciences, Queensland University of Technology
Kerryn Caulfield	Composites Australia
Marina Williams/Sam Wood	AWU

Consultation and validation processes

Consultations during the development and validation process were undertaken with the ACA and with RTOs already working in the field or intending to offer this qualification.

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The following individuals and organisations participated in the development process. The great value of their expertise and input is gratefully acknowledged.

Name		**Organisation**	**State**
Mark	Arundell	SkillsTech (TAFE)	Qld
Ron	Baker		WA
Fikry	Barouky	Saudi Aramco	
Ron	Berry	Altex Coatings Limited	NZ
Ben	Biddle	Wattyl Protective & Marine Coatings	Qld
Alan	Buckley	Technical Pacific Pty Ltd	NSW
Phillip	Coleman	TAFE NSW	NSW
John	Cooper	Prostrip	NSW
Geoff	Coward	McElligott Partners Pty Ltd	Vic
Bill	Doherty	TAFE NSW	NSW
Mark	Dromgool	KTA Tator	Vic
Warren	Easterbrook	Glendale TAFE	NSW
Jan	Evensen	Jotun Norway	
Sam	Formosa	TAFE NSW	NSW
Todd	Fotheringham	CTI Consultants Pty Ltd	NSW
Rob	Francis		
Ian	Glover	Corrotek	WA
Peter	Haberecht	MATENV	
Michael	Hambrook	APMF	NSW
Shannon	Heath		WA
Harold D	Hilton	Atlas MTT LLC	
Brian	Johnson	TAFE NSW	NSW

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Name		**Organisation**	**State**
Jeremy	Knight	TAFE NSW	NSW
Kenneth	Lofhelm	PCCP	Vic
Willie	Mandeno	OPUS	NZ
Bill	McEwan	CTI Consultants Pty Ltd	NSW
John	Moffatt	Biolab Industrial	NZ
Roy	Orr	Peerless Industrial Systems	WA
Michael	Porter	Barry Bros	Vic
Ted	Riding	Jotun Australia	
Fred	Salome	CTI Consultants Pty Ltd	NSW
Washington	Sanchez	Biolab Industrial	NZ
Mark	Schilling	CPI	
Brad	Shaw	East Gippsland TAFE	Vic
Stuart	Smith	Melbourne Water	Vic
Ben	Solomon	Sunshine Powder Coatings	Qld
Ian	Squire	TAFE NSW	NSW
Nick	Subotsch	Peerless Industrial Systems	Vic
Morris	Thor	TAFE NSW	NSW
Ben	Veldhuis	TAFE NSW	NSW
Ian	Vickery	TAFE NSW	NSW
Kevin	Walker	EXITO	NZ
Dean	Wall	Australasian Corrosion Association	Tas
Geoff	White	Maunsell/AECOM	Qld
Heather	Yerbury	Boral Resources (Qld) Pty Ltd	Qld
Mark	Weston	Incospec & Assoc	SA

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Name		Organisation	State
Derek	Cupp	MISAC	SA

In addition, Geoff White, Chair TCTG, ACA, presented the findings to the ACA annual conference. The list of recipients is not known to this project but the response was positive.

The final drafts of the new units and qualification have been validated and signed off by all major stakeholders (both industry and RTOs) with no outstanding or unresolved issues. Validation and acceptance of final drafts was undertaken by email. A separate face-to-face validation meeting was held with RTOs intending to offer this qualification (included in the list above), in particular to check on possible implementation issues. They also signed off with no unresolved issues.

Clear and full support for endorsement of the new qualification and units has been provided by all stakeholders.

Appendix 8: Trade Measurement units and Skill Sets

Development of Trade Measurement units and Skill Sets

Responsibility for Australia's trade measurement system is currently shared between the Commonwealth, States and Territories. By 2010, responsibility will transfer to the Commonwealth and in preparation for that, NMI wished to establish a nationally consistent training and skills recognition system that is competency based with qualifications (or Skill Sets) that align with the job roles of trade measurement and fair trading personnel. In particular they focused on the competency needs of Verifiers, Inspectors and Senior Inspectors.

MSA contracted Ivan Johnstone (CIT Solutions Pty Ltd) to undertake this work which included reviewing the suite of trade measurement units in MEM05. The eight MEM units in question (MEM15015-15022) are listed as specialist elective units within MEM40105 Certificate IV in Engineering. Research indicated they were not being used outside the Qld Office of Fair Trading regulatory environment, who have provided written support for the changes. The level of change proposed to the units to support the new regulatory environment that will be in place in 2010 was significant and resulted in development of 14 new units of competency.

The new units will not be aligned to any qualifications, but will be available for use in defined Skill Sets in MSA07 and for importation to proposed new qualifications under development by Government Skills Australia.

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Project management

This development has been overseen by MSA's Laboratory Operations Board Sub-committee with significant technical assistance provided by NMI staff and committees.

The individuals and enterprises/organisations represented on the Board Sub-committee are set out in the following table:

Name	**Enterprise/organisation**
David Graham	Huntsman Chemicals
Duncan Jones	Science Industry Australia
Gail Silman	Ai Group
Ian Curry	AMWU
Kim Peterson	TAFE NSW
Marian Haire	National Measurement Institute
Bob Paton Barbara Wallace	MSA CEO MSA QA Manager

Consultation and validation

Consultations during the development and validation process were undertaken with the following key trade measurement personnel from all jurisdictions throughout Australia. The great value of their expertise and input is gratefully acknowledged.

Name		**Organisation**	**State**
Marion	Haire	National Measurement Institute (NMI) Sydney	NSW
Ian	Bentley	National Measurement Institute (NMI) Sydney	NSW
Mathew	Foot	National Measurement Institute (NMI) Sydney	NSW
Anne	Galvin	National Measurement Institute (NMI) Sydney	NSW
Ron	Begg	National Measurement Institute (NMI) Canberra	ACT
Darryl	Hines	Trade Measurement QLD, Fair Trading	QLD

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Name		**Organisation**	**State**
Ron	Plummer	Trade Measurement & Standards, Justice	TAS
Les	Anderson	Trade Measurement	NT
Lindsay	Tegart	Trade Measurement, Fair Trading	NSW
Russell	Jackson	Trade Measurement, Consumer Affairs	VIC
Doug	Berry	Trading Standards Branch	WA
Tony	Blefari	Trade Measurement, Fair Trading	SA
Grant	Fuller	Trade Measurement, Fair Trading	ACT
Olga	Ford	Office of Fair Trading	NSW
Lynn	Greenwood	Government Skills Australia	SA

The final drafts of the new units and Skill Sets have been validated and signed off by all major stakeholders with no outstanding or unresolved issues. Validation and acceptance of final drafts was via a workshop and email.

Marian Haire (NMI's national Training and Technology Transfer Manager with responsibility for coordination of training and recognition/assessment using the new units and Skill Sets) has signed off with no unresolved issues.

Appendix 9: Recreational Vehicle qualifications

Development of the Recreational Vehicle qualifications in MSA07v6

The recreational vehicle qualifications were originally included in THC99 under the Tourism and Hospitality National Industry Training Advisory Board. In 2004, the qualifications were revised, with minimal changes.

With the merger of national ITABs into the ten Industry Skills Councils, THC04 came under the jurisdiction of the Service Industries Skills Councils. As the needs of the recreational vehicle manufacture, service and repair sectors relate to manufacturing and engineering, the sector determined their qualification needs would be more appropriate under the coverage of the Manufacturing Industry Skills Council.

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Manufacturing Skills Australia (MSA) undertook to review and update the qualifications and their associated units of competency to bring them into line with current industry needs and with similar manufacturing, service and repair qualifications.

Kevin Hummel of Total Training and Performance Solutions (TaPS) was commissioned to undertake a Scoping Study in 2009. The Scoping Study Report noted that:

- users of THC04 felt it was somewhat inflexible and thus causing some difficulties
- to increase flexibility job based units of competency should be replaced by skills based units of competency (and this may require an adjustment to the qualification packaging rules)
- where there are relevant units of competency which are used by other industry sectors, they should be used in preference to RV specific units covering the same area, unless there are RV specific contexts which they cannot meet
- units and skills sets covering restricted licence requirements should be imported where appropriate
- relevant Competitive Manufacturing units should be included as elective units, while still requiring a sufficient technical core.

MSA supported the findings and contracted TaPS to undertake the agreed changes. Further industry consultations were undertaken prior to developing a detailed specification for the new units of competence and new qualification.

Meeting industry needs

The major industry drivers for the improvements to this package are outlined below:

- RTOs currently servicing this sector support a restructuring of the qualification to make it more flexible and believe they can adapt their existing resources fairly readily. They also see a restructure as possibly making it easier to use suitable resources from other sectors.
- Industry supports increased access to training and resources and is concerned that a sufficient broad base of skills be maintained to allow for both flexibility in workforce deployment and also for portability of skills across the sector.
- This is a sector which is growing and which has wide regional coverage. It is highly concentrated in terms of manufacturing, but with a broad range of smaller manufacturers. Service and repair (and sales) tends to be many small and medium businesses, often with a formal relationship with a manufacturer. This does not prevent them from servicing/repairing any other RV.

Project management

The project was overseen by an MSA Board Sub-Committee made up of major stakeholders. The terms of reference were to:

- assist in the identification of stakeholders to be consulted for the project
- identify and assist in the resolution of industry issues in relation to strategic objectives of MSA’s projects
- provide industry input and advice on:
  - industrial issues

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  - training and assessment issues
  - priority areas for industry skills development
  - appropriate methods for collection, collation and consolidation of industry information
  - validity of the content of project outcomes
- provide feedback on MSA's development work undertaken for the area covered
- exchange information as appropriate between MSA, industry and other relevant professional groups covered
- provide feedback on the project development work for the area of interest
- make recommendations to the MSA Board on acceptance of the product of the project..

The individuals and enterprises/organisations represented on the MSA Board Sub-Committee are set out in the following table:

Name	**Enterprise/organisation**
Graham Attwood (Chair)	RMax
Kerryn Caulfield	Composites Australia
Richard Lindner	Manufacturing Skills Queensland
Alex Stanojevic	Ai Group
Heather Yerbury	Boral Concrete Products
Ian Booth	Australasian Corrosion Association
Sam Wood	AWU

Consultation and validation processes

Consultations during the development and validation process were undertaken with:

- technical experts from the relevant sub-sector or specialty area of expertise
- representatives of RTOs who already offer current qualifications and/or are intending to offer the qualification.

Consultation was largely by use of CAJA, face-to-face and email with expert input sought and obtained for the specific needs of the project.

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Drafts of all units of competence and qualifications were then posted on the MSA website for validation and stakeholders were advised by email about how to access the site and provide feedback. This included industry stakeholders listed on the MSA database, State industry advisory bodies, and State Training Authorities.

This feedback was used to further refine the units and qualifications. In some cases, the feedback received and the units involved were reviewed again by technical experts prior to final editing.

The following individuals and organisations were involved in the development process. The great value of their expertise and input is gratefully acknowledged.

First Name	Second Name	Organisation	State
Maree	Saggers	7th St Caravans	NSW
Gary	Mitchell	ACR caravan repairs	NSW
Alan	Mcdonald	Aerodynamic developments	NSW
Jim	Massey`	Australian Motor Homes Pty Ltd	NSW
Rod	Payten	Camden Caravans	NSW
Jane	McCorkell	Caravan Camping Industry Association	NSW
David	Carlon	Carlon Caravans	NSW
The	Manager	Chapmans Coromal Caravans Nowra	NSW
Robert	Hare	CIL Insurances - Caravan Insurance Leaders	NSW
Narelle		Classic Caravan & Trailer Repairs	NSW
Brian	Fletcher	Classic Caravan and Trailer Repairs	NSW
The	Manager	Coromal Caravans Central Coast	NSW
Russell	Wood	Cub Campers	NSW
Cesar	Tabet	Dan's Caravans	NSW
Peter	Hands	Express Campers	NSW
Alison	Wood	Five Star Campers	NSW

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Grant	Brierly	Frontline Campervans	NSW
Alan	Fulcher	Fulcher's Caravans	NSW
Igor	Muriti	I & D Industries	NSW
Peter	Blanshard	Institute of Automotive Mechanical Engineers	NSW
Damian	Charleson	Jayco Newcastle	NSW
David	Carrick	Jayco Sydney	NSW
Ian	Durance	Kimberley Kampers	NSW
Ron	Borton	Kimberly Kampers	NSW
Rick	Martin	Kimberly Kampers	NSW
Rod	Coles	Millard Caravans	NSW
Gary	Willer	Millard Caravans	NSW
Chris	Parish	MSA	NSW
The	Manager	Opalite Caravans	NSW
Stephen	Edwards	Parravans Caravan World	NSW
Mark	Fawcett	South Western Sydney Institute of TAFE, Wetherill Park College	NSW
Keith	Harrison	Suncamper	NSW
Mike	Rowe	Suncamper	NSW
Russell	Bale	SWSI TAFE	NSW
Thor	Morris	TAFE NSW SWSI	NSW
Rob	Surdonic	The Caravan Company Pty Ltd	NSW
Michael	Lord	Trakka Pty Ltd	NSW
David	Wallis	Trakka Pty Ltd	NSW
Deborah	Joyce	Transport and Logistics Industry Skills Council	NSW
Daryl	Buckingham	Ultimate Campers	NSW

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Faye	Watson	Watson's Caravans & RVs Coffs Harbour	NSW
Kris	Watson	Watsons Caravans and RVs	NSW
Adam	Watson	Watsons Caravans Coffs Harbour	NSW
Shane	Martin	Watsons Caravans Port Macquarie	NSW
Glen	Anderson	Wetherill Park TAFE	NSW
Trevor	Smith	Wetherill Park TAFE	NSW
Bruce	Binns	Winnebago Industries	NSW
Jodie	Harris	Winnebago Industries	NSW
Barry	Baillie		NSW
Bob	Browne		NSW
Nicola	Burridge		NSW
Barry	Cramond	TEATAC (NT) Inc	NT
Paul	Bridge		Qld
Barry	Barker	Arrow Caravans and Towbars	Qld
Graham	Best	Best's Caravan Services	Qld
Greta	Best	Best's Caravan Services	Qld
Jim	Carnavas	Brisbane Camperland	Qld
Joshua	Carnavas	Brisbane Camperland - Jayco	Qld
Brendan	Saggers	Brisbane RV's	Qld
Merv	Flynn	Caravan Repair Centre	Qld
Garry	Bushell	Caravan Trade and Industries Association Queensland	Qld
Ron	Chapman	Caravanning Queensland	Qld
Mark	Glencross	City Caravan Centre	Qld
The	Manager	Classic RTM	Qld
Bill	Connor	Coromal Caravans Sunshine Coast	Qld

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Warren	Wheelock	Coromal Caravans Sunshine Coast	Qld
Nick	Oliver	Cutloose RV	Qld
Brett	Wright	CVIAQ	Qld
Kirk	Straughen	Department of Transport and Main Roads	Qld
The	Manager	Desert Edge Trailers	Qld
The	Manager	Dreamland Trailers	Qld
The	Manager	Dryden Trailers	Qld
Paul	Dawes	Gold Coast Caravan Sales	Qld
The	Manager	Golf Caravans	Qld
Stewart	Cameron	Hinterland Outdoors	Qld
Brendan	Kerr	Jayco Townsville	Qld
The	Manager	Kamparoo	Qld
Jan	McNeil	Kedron Caravans	Qld
Gary	Kratzmann	Kratzmann Caravans	Qld
Greg	Wetkin	Lifestyle RVs	Qld
Ken	Vaughan	Limit Seeker Camper Trailers	Qld
Erik	Salonen	Manufacturing Skills Qld	Qld
Gary	Smiley	Manufacturing Skills Queensland	Qld
Brendon	Beckett	Morayfield State High School	Qld
The	Manager	Paradise Motorhomes	Qld
Kevin	Bluhdorn	Skills Tech Australia	Qld
Peter	Donaldson	Skills Tech Australia	Qld
Gordon	Elledge	Skills Tech Australia	Qld
Scott	Ovenden	Skills Tech Australia	Qld
Trevor	Scott	Skills Tech Australia	Qld

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The	Manager	Sunland Caravans	Qld
Jeffrey	Hockam	Sunshine Coast Institute of TAFE	Qld
Bede	O'Brien	Sunshine Coast TAFE	Qld
The	Manager	Swagman Motorhomes	Qld
The	Manager	Tavlor Motorhomes	Qld
Michael	Ritzau	Adventura Caravans	SA
Frank	Tabone	Adventure Campers	SA
Stuart	Livingstone	CCIA SA	SA
Gareth	Handshin	Challenge Campertrailers	SA
Dario	Priori	Dario Caravans	SA
Chris	Barrett	Dario Caravans and Repairs	SA
Cheryl	Bald	DFEEST	SA
Leonie	Cooke	DFEEST	SA
Sherelee	Rose	DFEEST	SA
Rob	Heaslip	Heaslip Campers	SA
Derek	Cupp	Manufacturing Industry Skills Advisory Council	SA
Mike	Griggs	Mike Griggs Caravan Service Centre	SA
Rhonda	Tunks	MISAC (Manufacturing Industry Skills Advisory Council SA Inc)	SA
Renae	Balckshaw	TAFE SA	SA
Anna	Papzoglov	TAFE SA	SA
Ron	Williams	TAFEsa	SA
Margaret	Collings	tafeSA Noarlunga Campus	SA
Anne	Urquhart	AMWU	Tas
The	Manager	Caravan Industry Australia (Tasmania)	Tas

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Phillip	Canning	Discovery Holiday Park Strahan	Tas
Danny	Gower	Island Motor Camper Conversions	Tas
David	O'Byrne	Liquor, Hospitality and Miscellaneous Union	Tas
Debra	Doherty	Skills Tasmania	Tas
Tim	McLaren	Stanley Caravan and Tourist Park	Tas
The	Manager	Tasmania National Parks Association	Tas
David	Gutteridge	Tasmanian Polytechnic	Tas
Rod	Mason	Tasmanian Skills Institute	Tas
Frank	Hussey	Tourism Tasmania	Tas
Stephen	Farley	Treasure Island Caravan Parks	Tas
Ken	Dorsey	Workforce Development	Tas
Trevor	Eastman		Vic
Mark		Aussie Wide Caravans	Vic
Greg	Walsh	Automotive Training Victoria	Vic
Darren	French	Avan Caravans	Vic
The	Manager	Billabong Custom Caravans	Vic
Peter	Wright	Caravan Industry Assoc. Victorian Trades Division	Vic
The	Manager	Caria Caravans	Vic
Andre		Chisholm TAFE	Vic
Noel	Sutcliffe	Chisholm TAFE	Vic
Ron	Wylde	Chisholm TAFE	Vic
The	Manager	Concept Caravans	Vic
The	Manager	Davsher Campers and Caravans	Vic
The	Manager	Designer Vans	Vic
Luke	Behncke	DIIRD	Vic

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The	Manager	Dreamhaven Caravans	Vic
The	Manager	Driftaway Caravans	Vic
The	Manager	Eagle Caravans	Vic
Darren	French	Evernew Caravans	Vic
Neville	Watson	Ford Motor Company of Australia	Vic
The	Manager	Galaxy Caravans	Vic
The	Manager	Goldstream RV	Vic
Chris	Riley	Jayco	Vic
Daniel	McDonald	Jayco (training)	Vic
The	Manager	Jurgens Caravans	Vic
Diana	McGowan	Kangan Institute of TAFE	Vic
Phil	Murphy	Kangan Institute of TAFE	Vic
Vince	Panozzo	Kangan Institute of TAFE	Vic
Bill	Reece	Kangan Institute of TAFE	Vic
Wayne	Walter	Kangan Institute of TAFE	Vic
The	Manager	Kingdom Caravans	Vic
The	Manager	La Vista Caravans	Vic
Michael	Waterson	Lumen Australia	Vic
The	Manager	Majestic Caravans	Vic
Alex	Bernhardt	Manufacturing and Engineering Skills Advisory Body (MESAB)	Vic
Peter	May	May West Caravans	Vic
Gordon	Wilson	May West Caravans	Vic
The	Manager	Montana Caravans	Vic
Gerry	van Oosterom	NMIT Epping Campus	Vic

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Ian	Roberts	NMIT, Building & Construction	Vic
The	Manager	Nova Caravans	Vic
The	Manager	Olympic Caravans	Vic
The	Manager	Paramount Caravans	Vic
Colin	Young	Recreational Vehicle Manufacturers Association of Australia Inc.	Vic
The	Manager	Regal Caravans	Vic
Mary	Holmes	Resource Education and Training Pty Ltd	Vic
Faye	Milroy	Resource Education and Training Pty Ltd	Vic
The	Manager	Retreat Caravans	Vic
The	Manager	Roadstar Caravans Pty.Ltd.	Vic
The	Manager	Roma Caravans	Vic
The	Manager	Royal Flair	Vic
Robert	Funda	RVMAA	Vic
The	Manager	Spaceland Industries	Vic
Phil	Savory	Stockman Products	Vic
The	Manager	Sunliner Recreational Vehicles	Vic
Joe	Markovich	Supreme Caravans	Vic
The	Manager	Track Trailer	Vic
The	Manager	Trailblazers RV	Vic
The	Manager	Trakmaster	Vic
The	Manager	Traveller Caravans	Vic
The	Manager	Truelux 5th Wheel	Vic
John	Kyriakidis	Vanguard Caravans	Vic
Helen	Constanza	Windsor Caravans	Vic

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The	Manager	Wirr-away Motorhomes	Vic
Peter	Hancock	Workplace Learning Initiatives	Vic
Stuart	Loly	Workplace Learning Initiatives	Vic
The	Manager	A1 Caravans	WA
The	Manager	Caravan and RVs Superstore	WA
The	Manager	Caravanland	WA
Pat	Strahan	Combined Industry Associations	WA
Lubor	Hebik	Coromal Caravans	WA
Ida	Yee	Coromal Caravans	WA
Brad	van Hement	Coronel	WA
David	Hill	Elross Caravans	WA
Dave	Hicks	Engineering and Automotive Training Council Inc (EATC)	WA
Mark	Harper	Engineering and Automotive Training Council Inc (WA)	WA
The	Manager	Freedom caravans	WA
The	Manager	George Day Caravans	WA
Lyle	Barrett	IAME	WA
The	Manager	Mandurah Caravan & RV Centre	WA
Dennis	Baker	Polytechnic West	WA
Colin	Russell	Swan TAFE	WA
The	Manager	Trailstar Caravans	WA

Clear and full support for endorsement of the revised Training Package has been provided by all industry and RTO stakeholders.

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MSA10107 Certificate I in Manufacturing (Pathways)

Modification History

Release 2 - imported LMF units superseded and replaced with equivalent MSF units

Description

The Certificate I in Industry (Pathways) is designed to develop both skills that are essential for employment and skills that relate directly to a **work activity as specified in the core technical unit**. The units chosen **must** provide practical skills that are relevant and useful to the area in which the person hopes to gain employment or is currently working. The group of units should be chosen to support the project and should incorporate both the technical and employability skills needed for work.

Completion of a *Certificate I in Manufacturing* (*Pathways*) should provide the student with a set of competencies that collectively open up pathways into employment and/or further study.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY
MSA10107 Certificate I in Manufacturing (**Pathways**) The following table contains a summary of the Employability Skills required for this qualification. The Employability Skills facets described here are broad industry requirements that may vary depending on qualification packaging options.

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• complete all reporting as required • report anything unusual • alert the appropriate individuals • record results • complete logs and reports • record the result • receive and relay oral and written messages • interpret oral or written messages • respond to information • complete workplace forms
Teamwork	• working as part of a work team • role of individual in organisational structure • individual role in achieving section/team, plant and company objectives • work in a team • identify individual tasks that are part of the team requirement
Problem solving	• recognise common problems • identify problems and take required action • respond to routine problems
Initiative and enterprise	• take appropriate corrective action • select appropriate equipment • identify units to be used • distinguish between urgent and non-urgent tasks
Planning and organising	• organise relevant equipment and tools • organise requests and tasks • planning workplace procedures, scheduling and performance • plan own work • plan and organise activities • organise daily work plan
Self-management	• find out what is required for the job • recognise a situation requiring action • implement within appropriate time constraints • complete own work activities • identify task requirements and work role • plan own work • meet time lines • seek assistance from other team members where appropriate

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Learning	• recognise anything unusual • self-check numerical information • clarify cleaning duties • ask questions of appropriate person • seek advice from relevant personnel
Technology	• use equipment • turn equipment on and off as required by procedures • monitor equipment • make measurements • use computer system • use measuring devices

Packaging Rules

To be awarded a Certificate I in Manufacturing (Pathways), competency must be achieved in **nine** (**9**) units of competency:

- **three** (**3**) core units of competency
- **six** (**6**) elective units of competency, three (3) of which may be selected from this Training Package, other endorsed Training Packages and accredited courses, as specified below.

*Note that the industry/technical units coded MSAPCII are designed for use only in a Pathways qualification or skills set. They should not be used in other instances as replacements for units that have direct job outcomes.

Core units of competency

Select all **three** (**3**) units from the following list.

Unit code	**Unit title**
MSAPCI101A	Adapt to work requirements in industry
MSAPCI102A	Apply effective work practices
MSAPCI103A	Demonstrate care and apply safe practices at work

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Elective units of competency

Group A - Industry/technical units*

Select a maximum of **one** (**1**) unit from the following list.

Unit code	Unit title
MSAPCII296A	Make a small furniture item from timber
MSAPCII297A	Make an object from cloth using an existing pattern
MSAPCII298A	Make an object from metal
MSAPCII299A	Make an object from plastic

Group B - Other elective units

Select **five** (**5**) units from the following list.

Unit code	Unit title
MSFFM1002	Operate basic woodworking machines
MSFFM2001	Use furniture making sector hand and power tools
MSFFM2002	Assemble furnishing components
MSFFM2003	Select and apply hardware
MSFFM2005	Join solid timber
MSFSF1001	Produce basic soft furnishings accessories
MSFSF2001	Cut single layer fabrics
LMTCL2001B	Use a sewing machine
LMTCL2003B	Identify fibres and fabrics
LMTCL2006B	Press work
LMTCL2007B	Lay up, mark and cut uncomplicated fabrics and lays
LMTCL2008B	Finish garment production

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MEM03001B	Perform manual production assembly
MEM05007C	Perform manual heating and thermal cutting
MEM05012C	Perform routine manual metal arc welding
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MSAPMOPS100A	Use equipment
MSAPMOPS101A	Make measurements
MSAPMOPS102A	Perform tasks to support production
MSAPMOPS244A	Layout and cut materials
PMBFIN201C	Finish products and components
PMBFIN205C	Hand decorate products
PMBPREP205C	Assemble materials and equipment for production
PMBPREP206C	Prepare materials to formulae
PMBPROD236C	Operate hand held air/power equipment for production processes
PMBPROD240C	Cut materials

A maximum of three (3) relevant units can be selected from this Training Package, other endorsed Training Packages and accredited courses, where those units are available for inclusion at Certificate I or II.

The elective unit(s) from another Training Package must relate to the core function/role of the selected industry/technical unit.

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MSA10207 Certificate I in Process Manufacturing

Modification History

Not applicable.

Description

The Certificate I in Process Manufacturing is intended for entry to the industry and addresses job outcomes at this level. It has been developed as a common certificate for use across the three process manufacturing sectors:

- chemical, hydrocarbons and oil refining
- plastics, rubber and cablemaking
- manufactured mineral products.
-

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
MSA10207 Certificate I in Process Manufacturing The following table contains a summary of the Employability Skills required by the process manufacturing industries for this qualification. The Employability Skills facets described here are broad industry requirements that may vary depending on qualification packaging options.	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• complete all reporting as required

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• report anything unusual • receive and relay oral and written messages • interpret oral or written messages • respond to information
Teamwork	• work as part of a work team • understanding the role of individual in organisational structure • understanding individual role in achieving section/team, plant and company objectives • identify individual tasks that are part of the team requirement
Problem solving	• recognise common problems • identify problems and take required action • respond to routine problems
Initiative and enterprise	• take appropriate corrective action • select appropriate equipment • identify units to be used • distinguish between urgent and non-urgent tasks
Planning and organising	• organise relevant equipment and tools • organise requests and tasks • plan own work • plan and organise activities • organise daily work plan
Self-management	• find out what is required for the job • recognise a situation requiring action • complete own work activities • identify task requirements and work role • plan own work • meet time lines • seek assistance from other team members where appropriate
Learning	• recognise anything unusual • self-check numerical information • clarify cleaning duties • ask questions of appropriate person • seek advice from relevant personnel
Technology	• use equipment • turn equipment on and off as required by procedures • monitor equipment • use computer system

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Packaging Rules

Packaging Rules

To be awarded the Certificate I in Process Manufacturing, competency must be achieved in **seven** (**7**) units of competency.

- **three** (**3**) core units of competency
- **four** (**4**) elective units of competency, **two** (**2**) of which may be selected from this Training Package, other endorsed Training Packages and accredited courses, as specified below.
-

Core units of competency

- Select all **three** (**3**) units from the following list:

Unit code	Unit title
MSAPMOHS100A	Follow OHS procedures
MSAPMSUP100A	Apply workplace procedures
MSAPMSUP102A	Communicate in the workplace

Elective units of competency

- Select **four** (**4**) units from the following list:

Unit code	Unit title
MSAPMOHS110A	Follow emergency response procedures
MSAPMOPS100A	Use equipment
MSAPMOPS101A	Make measurements
MSAPMOPS102A	Perform tasks to support production
MSAPMSUP101A	Clean workplace or equipment
MSAPMSUP106A	Work in a team
MSAPMSUP172A	Identify and minimise environmental hazards
PMBHAN103C	Shift materials safely by hand

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- Up to two (2) relevant units may be chosen from this Training Package, other endorsed Training Packages and accredited courses, where those units are available for inclusion at Certificate I.
- A maximum of one (1) unit may be chosen from units available at MSA20107 Certificate II in Process Manufacturing.

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MSA20107 Certificate II in Process Manufacturing

Modification History

Release 5 - Imported unit code updated to current release

Release 4 - Imported unit code updated.

Release 3 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package.

Release 2 - Imported unit codes updated.

Description

The Certificate II in Process Manufacturing is intended for competent production workers who undertake vital production support roles directly related to producing products. The production worker would apply a breadth and depth of knowledge to a defined range of situations and would be expected to apply this knowledge to solve a defined range of problems by applying known solutions to a limited range of predictable problems.

This qualification has been developed for use across the three process manufacturing sectors:

- chemical, hydrocarbons and refining
- plastics, rubber and cablemaking
- manufactured mineral products.

Licensing considerations

There are no specific licenses that relate to this qualification. However, some units in this qualification may have licensing or regulatory requirements depending on the work context. Local regulations should be checked for details.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

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Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

MSA20107 Certificate II in Process Manufacturing

The following table contains a summary of the Employability Skills required by the process manufacturing industries for this qualification. The Employability Skills facets described here are broad industry requirements that may vary depending on qualification packaging options.

Due to the high proportion of electives required by this qualification, the industry/enterprise requirements described for each Employability Skill are representative of the industry in general and may not reflect specific job roles. Learning and assessment strategies for this qualification should be based on the requirements of the units of competency for this qualification.

Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• complete logs, reports and plant documentation • access and interpret production plans and information • provide appropriate workplace information • give and follow routine instructions • provide written and oral reports
Teamwork	• work as part of a team • identify and describe own role and role of others • identify own role and responsibility within a team
Problem solving	• recognise known faults that occur during the operation • identify and take action on causes of routine faults • identify non-routine process and quality problems and take appropriate action • respond to routine problems
Initiative and enterprise	• suggest improvements • make adjustments to improve equipment performance • determine problems needing action • report problems outside area of responsibility • raise questions regarding requirements and expectations • distinguish between causes of faults • identify product out of specification • safely shutdown equipment in abnormal circumstances
Planning and organising	• plan own work • achieve production targets • identify production targets • recognise hazards and follow appropriate hazard control methods

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Self-management	• identify work requirements • plan own work requirements from production requests • operate within appropriate time constraints and work standards • select and use appropriate equipment, materials, processes and procedures • identify task outcomes and work role
Learning	• ask questions to gain information • seek clarification • participate in improvement procedures
Technology	• check process is operating within required limits • monitor equipment operation • use appropriate instruments • monitor and adjust machine functions • use forklift controls, instruments and indicators • carry out pre-operational checks on equipment

Packaging Rules

Packaging Rules

To be awarded the Certificate II in Process Manufacturing, competency must be achieved in **fourteen** (**14**) units of competency:

- **three** (**3**) core units of competency
- **eleven** (**11**) elective units of competency, four (4) of which can be selected from this Training Package, other endorsed Training Packages and accredited courses, as specified below.

Note: Units marked with an asterisk have one or more prerequisite requirements. The prerequisites for these units are to be counted in the total number of units required in the elective group. Please refer to individual units for details.

Core units of competency

- Complete all **three** (**3**) units of competency from this list.

Unit code	**Unit title**

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Unit code	Unit title
MSAENV272B	Participate in environmentally sustainable work practices
MSAPMOHS200A	Work safely
MSAPMSUP210A	Process and record information

Group A - Elective units

- Select a minimum of **eleven** (**11**) units of competency from the following list.

Support units		
Unit code	**Unit title**	**Prerequisites**
LMTGN2008B	Coordinate work of team/section	
MEM13003B	Work safely with industrial chemicals and materials	
MEM16006A	Organise and communicate information	
MEM16007A	Work with others in a manufacturing, engineering or related environment	
MEM16008A	Interact with computing technology	
MEM18001C	Use hand tools	
MEM18002B	Use power tools/hand held operations	
MSS402002A	Sustain process improvements	
MSS402020A	Apply quick changeover procedures	
MSS402021A	Apply Just in Time (JIT) procedures	
MSS402030A	Apply cost factors to work practices	
MSS402040A	Apply 5S procedures	
MSS402050A	Monitor process capability	
MSS402051A	Apply quality standards	

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Support units		
MSS402060A	Use planning software systems in operations	
MSS402080A	Undertake root cause analysis	
MSAPMOHS100A	Follow OHS procedures	
MSAPMOHS110A	Follow emergency response procedures	
MSAPMOHS205A	Control minor incidents	
MSAPMOHS210B	Undertake first response to non-fire incidents	
MSAPMOHS212A	Undertake first response to fire incidents	
MSAPMOHS216A	Operate breathing apparatus	
MSAPMOHS217A	Gas test atmospheres	
MSAPMOHS220A	Provide initial first aid response	
MSAPMOPS100A	Use equipment	
MSAPMOPS101A	Make measurements	
MSAPMOPS102A	Perform tasks to support production	
MSAPMPER200C	Work in accordance with an issued permit	
MSAPMPER201A	Monitor and control work permits	
MSAPMPER202A	Observe permit work	*
MSAPMPER205C	Enter confined space	*
MSAPMSUP100A	Apply workplace procedures	
MSAPMSUP101A	Clean workplace or equipment	
MSAPMSUP102A	Communicate in the workplace	
MSAPMSUP106A	Work in a team	
MSAPMSUP172A	Identify and minimise environmental hazards	
MSAPMSUP201A	Receive or despatch goods	
MSAPMSUP200A	Achieve work outcomes	

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Support units		
MSAPMSUP204A	Pack products or materials	
MSAPMSUP205A	Transfer loads	
MSAPMSUP230A	Monitor process operations	
MSAPMSUP240A	Undertake minor maintenance	
MSAPMSUP273A	Handle goods	
MSAPMSUP280A	Manage conflict at work	
MSAPMSUP291A	Participate in continuous improvement	
MSAPMSUP292A	Sample and test materials and product	
PMBHAN103C	Shift materials safely by hand	
TLID2010A	Operate a forklift	
RIIRIS201B	Conduct local risk control	
Technical units		
FPICOT2238A	Cut materials with a hand-held chainsaw	
MSAPMOPS200A	Operate equipment	
MSAPMOPS212A	Use enterprise computers or data systems	
A maximum of four (4) relevant units may be selected from this Training Package, other endorsed Training Packages and accredited courses, where those units are available for inclusion at Certificate II or III. Note: a maximum of two (2) units may be chosen from Certificate III.		

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MSA20208 Certificate II in Manufacturing Technology

Modification History

Version 2 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package.

Description

This qualification applies to a learning and assessment environment where access to normal production operations is not available. A typical environment will be for application in a VET in Schools delivery environment or other simulated or trial manufacturing environment where a high degree of supervision exists. The units are suitable for delivery in a school environment and for schools to contextualize the units to local manufacturing industry activities.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
MSA20208 Certificate II in Manufacturing Technology The following table contains a summary of the employability skills as identified by industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that reflect skill requirements for this level.	
Employability Skill	**Industry/enterprise requirements for this qualification include**:

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Communication	• Access and interpret standardised documentation • Complete all reporting as required • Ask questions to increase understanding about workplace procedures • Read and interpret instructions • Respond to information • Access and use communication tools and equipment • Apply numeracy skills to work procedures
Teamwork	• Work effectively with others • Share information with peers • Understand role of individual within team process • Seek assistance with work operations as required
Problem-solving	• Recognise common problems and report inconsistencies • Monitor the job and make improvements • Respond to routine problems • Recommend improvements
Initiative and enterprise	• Take correct action and follow procedures • Recommend changes and improvements • Take action to make improvements • Adopt changes in accordance with procedures
Planning and organising	• Plan own work • Organise processes, tools and materials • Monitor own work outcomes • Organise and plan activities • Collect and organise information for work activity
Self-management	• Conduct all activities according to safety standards • Maintain housekeeping standards • Achieve planned outcomes within time constraints • Monitor own work performance • Assess own work • Seek assistance where appropriate
Learning	• Ask questions to aid learning • Identify own skill requirements • Ask questions to ensure understanding of own work requirements
Technology	• Use equipment and/or or information technology • Identify equipment appropriate for job • Use simple measuring devices • Collect and apply data and information from technology

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Packaging Rules

Packaging Rules

To be awarded a Certificate II in Manufacturing Technology, competency must be achieved in **ten** (**10**) units of competency:

- **five** (**5**) core units of competency
- **five** (**5**) elective units of competency, chosen as described below.

Core units

All **five (5)** of the following units must be completed.

Unit code	Unit title
MSAENV272B	Participate in environmentally sustainable work practices
MSAPMOHS200A	Work safely
MSS402001A	Apply competitive systems and practices
MSS402051A	Apply quality standards
MSS402080A	Undertake root cause analysis

Elective units

Select **five** (**5**) elective units from Groups A, B and C, as described below.

Group A - Manufacturing practice

At least one (1) of the following units must be completed but up to four (4) may be selected.

Unit code	Unit title
MSS402002A	Sustain process improvements
MSS402010A	Manage the impact of change on own work
MSS402031A	Interpret product costs in terms of customer

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Unit code	Unit title
	requirements
MSS402050A	Monitor process capability

Group B - Manufacturing Technology*

At least one (1) of the following units must be completed but up to four (4) may be selected.

Unit code	Unit title
MSAPCII295A	Operate manufacturing equipment
MSAPCII296A	Make a small furniture item from timber
MSAPCII297A	Make an object from cloth using an existing pattern
MSAPCII298A	Make an object from metal
MSAPCII299A	Make an object from plastic

Group C

Up to **two** (**2**) elective units can be chosen from other qualifications in this Training Package, other endorsed Training Packages and accredited courses where those units are available at Certificate I or II.

*Note that the manufacturing technology units listed above (coded MSAPCII) have been specifically developed for the Certificate II in Manufacturing Technology. They are designed for use only in a Pathways qualification or Skill Set. They should not be used in other instances as replacements for units that have direct job outcomes.

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MSA20510 Certificate II in Recreational Vehicle Service and Repair

Modification History

Release 5 - Imported elective unit updated to current release.

Release 4 - AU imported units updated. Prerequisites replaced by an asterisk. Equivalent.

Release 3 - MSACM units replaced by MSS units from MSSv2 Sustainability Training Package. Imported unit codes updated.

Release 2 - Group B elective units corrected due to a transfer error.

Description

This qualification covers the skills and knowledge required to perform the wide range of service and repair tasks performed on recreational vehicles.

Job roles/employment outcomes

The Certificate II in Recreational Vehicle Service and Repair has been developed as an entry level qualification for use in MSA07 Manufacturing Training Package. This qualification has been developed in response to an industry request. People with this qualification would be expected to work under supervision servicing and repairing recreational vehicles, including:

- motor homes
- caravans
- camper trailers
- slide-ons
- fifth wheelers

to meet Australian requirements, such as road worthiness and the Australian Design Rule (ADR).

They may work in a service and repair facility or a manufacturer's factory undertaking warranty work. Work may be for an insurance claim, modifying an existing recreational vehicle or undertaking routine servicing.

Application

The sector typically services and repairs any recreational vehicle as required. This may apply to the recreational vehicle body, fittings and running gear. It may be in response to a road (or other) accident, hail damage, vehicle modification or routine servicing. They may also specify and access outside specialist services, for example, for spray painting or licence requirements.

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Recreational vehicles may be made from a frame (timber, aluminium or steel) and skin (aluminium or fibre composite) or a manufactured wall panel or some other technology. They are typically mounted on a steel chassis. Fittings are typically timber/particle board but may be any other suitable material.

People with this qualification may be expected to:

- carry out insurance repair
- carry out other repairs
- work under warranty
- undertake modifications/refits to the recreational vehicle
- undertake routine servicing
- prepare a recreational vehicle for sale/resale.

This work will generally be undertaken in a workshop environment.

Training programs for this qualification are suitable to be undertaken as part of a formal training contract with an employer under an Australian Traineeship or Apprenticeship arrangement.

Pathways into the qualification

This qualification may be accessed by direct entry.

The units of competency contained within this qualification are common with other qualifications and credit should be granted towards this qualification where competency has already been achieved.

Credit should also be granted towards this qualification where competency has been achieved in units of competency contained within relevant skill sets.

The units of competency in this qualification reflect competencies which are practiced within the industry and recognition of prior learning (RPL) should be granted where there is sufficient evidence of competency from work-based experience.

Pathways from the qualification

Further qualification pathways from this qualification include MSA30510 Certificate III in Recreational Vehicle Service and Repair.

Additional qualification advice

MSA21108 Certificate II in Competitive Manufacturing and MSA30107 Certificate III in Process Manufacturing are available for team leaders or others who need a more generalist qualification covering the application of good manufacturing practice and lean principles.

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Licensing considerations

Units of competency in this qualification provide the underpinning knowledge and skills for various required licenses. Local regulations should be checked for details.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification**
Communication	• Accessing and interpreting standardised documentation • Completing all reporting as required • Asking questions to increase understanding about workplace procedures • Reading and interpreting instructions • Responding to information • Accessing and using communication tools and equipment • Applying numeracy skills to work procedures
Teamwork	• Working effectively with others • Sharing information with peers • Understanding role of individual within team process • Seeking assistance with work operations as required
Problem solving	• Recognising common problems and reporting inconsistencies • Monitoring the job and making improvements • Responding to routine problems • Recommending improvements
Initiative and enterprise	• Taking correct action and following procedures • Recommending changes and improvements

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• Taking action to make improvements • Adopting changes in accordance with procedures
Planning and organising	• Planning own work • Organising processes, tools and materials • Monitoring own work outcomes • Organising and planning activities • Collecting and organising information for work activity
Self-management	• Conducting all activities according to safety standards • Maintaining housekeeping standards • Achieving planned outcomes within time constraints • Monitoring own work performance • Assessing own work • Seeking assistance where appropriate
Learning	• Asking questions to aid learning • Identifying own skill requirements • Asking questions to ensure understanding of own work requirements
Technology	• Using equipment and/or information technology • Identifying equipment appropriate for job • Using simple measuring devices • Collecting and applying data and information from technology

Packaging Rules

Packaging Rules

To be awarded the Certificate II in Recreational Vehicle Service and Repair competency must be achieved in **fourteen** (**14**) units of competency:

- **three** (**3**) core units of competency
- **eleven** (**11**) elective units of competency, as specified below:
  - a minimum of **seven** (**7**) units of competency must be selected from Group A
  - the balance of units, to a maximum of **four** (**4**), may be selected from:
    - units of competency not previously selected from Group A
    - Group B units of competency listed.

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Note: Up to **four** (**4**) elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, as specified in Groups A and B.

Note: Where prerequisite units are identified, they must be counted in the total number of units required for completion of the qualification.

Core units of competency

Unit code	Unit title	Prerequisites
MSAENV272B	Participate in environmentally sustainable work practices	
MSAPMOHS200A	Work safely	
MSAPMSUP102A	Communicate in the workplace	

Elective units of competency

Group A

Unit code	Unit title	Prerequisites
AUMGTT001	Apply trim to vehicle components	
AURETR2015	Inspect and service batteries	
AURETR2012	Test and repair basic electrical circuits	
AURETR2010	Fabricate, test and repair wiring harnesses and looms	
AURETB3001	Repair electric braking systems	
AURTTB2001	Inspect and service braking systems	
AURTTD2004	Inspect and service suspension systems	
AURTTJ2002	Remove and refit wheel hubs and associated brake components	

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Unit code	Unit title	Prerequisites
AURTTA3017	Carry out vehicle safety and roadworthy inspection	
AURVTN2005	Remove and fit protector mouldings, transfers and decals	
AURVTP2007	Apply paint touch-up techniques	
AURVTS3004	Repair fibreglass and composite material components	
AURTTY3001	Repair chassis, frame and associated components	
AURVTT3015	Fabricate canvas products	
AURVTT3016	Fabricate frame structures	
AURVTT3019	Fabricate and install canopies and curtains	
AURVTG3011	Install side windows	
MEM05005B	Carry out mechanical cutting	*
MEM05012C	Perform routine manual metal arc welding	
MEM05050B	Perform routine gas metal arc welding	
MEM10002B	Terminate and connect electrical wiring	*
MEM12002B	Perform electrical/electronic measurement	
MEM12023A	Perform engineering measurements	
MEM18001C	Use hand tools	
MEM18002B	Use power tools/hand held operations	
MEM18038B	Maintain wheels and tyres	*
MEM18045B	Fault find/repair electrical equipment/components up to 250 volts single phase supply	*
MSAPMOPS101A	Make measurements	
MSARVS202A	Repair/service LP gas systems in a recreational vehicle	

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Unit code	Unit title	Prerequisites
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate II.		

Group B

Unit code	Unit title	Prerequisites
MEM09002B	Interpret technical drawing	
MEM11011B	Undertake manual handling	
MEM14004A	Plan to undertake a routine task	
MEM15024A	Apply quality procedures	
MSS402021A	Apply Just in Time procedures	
MSS402040A	Apply 5S procedures	
MSS402080A	Undertake root cause analysis	
MSAPMOHS220A	Provide initial first aid response	
MSAPMOPS212A	Use enterprise computers or data systems	
MSAPMSUP100A	Apply workplace procedures	
MSAPMSUP101A	Clean workplace or equipment	
MSAPMSUP106A	Work in a team	
MSAPMSUP280A	Manage conflict at work	
MSAPMSUP291A	Participate in continuous improvement	
MSARVS301A	Develop and update caravan industry knowledge	
MSARVG201A	Tow a recreational vehicle safely	
MSARVT201A	Apply technical knowledge of recreational vehicle manufacturing to work activities	

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Unit code	Unit title	Prerequisites
SIRXSLS002A	Advise on products and services	
TLID2010A	Operate a forklift	
UEGNSG604B	Fill gas cylinders	
Up to two (2) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate II.		

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MSA20610 Certificate II in Recreational Vehicle Manufacture

Modification History

Release 5 - Imported elective unit updated to current release.

Release 4 - AU imported units updated. Prerequisites replaced by an asterisk. Equivalent.

Release 3 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package.

Release - Imported unit codes updated.

Description

This qualification covers the skills and knowledge required to perform the wide range of tasks performed in the manufacture of recreational vehicles.

Job roles/employment outcomes

The Certificate II in Recreational Vehicle Manufacture has been developed as an entry level qualification for use in MSA07 Manufacturing Training Package. This qualification has been developed in response to an industry request. People with this qualification would be expected to work under supervision manufacturing recreational vehicles, including:

- motor homes
- caravans
- camper trailers
- slide-ons
- fifth wheelers

to meet Australian requirements, such as road worthiness and the Australian Design Rule (ADR).

They may work in a large manufacturing organisation or a smaller workshop.

Application

The sector typically manufactures recreational vehicles as required. This may include special/custom orders or standard manufacturer models. They may also specify and access outside specialist services, for example, for spray painting or licence requirements.

Recreational vehicles may be made from a frame (timber, aluminium or steel) and skin (aluminium or fibre composite) or a manufactured wall panel or some other technology. They are typically mounted on a steel chassis. Fittings are typically timber/particle board but may be any other suitable material.

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People with this qualification may be expected to:

- carry out the various stages in recreational vehicle manufacture
- undertake modifications/refits to a recreational vehicle
- prepare a recreational vehicle for sale.

This work will generally be undertaken in a factory or workshop environment.

Training programs for this qualification are suitable to be undertaken as part of a formal training contract with an employer under an Australian Traineeship or Apprenticeship arrangement.

Pathways into the qualification

This qualification may be accessed by direct entry.

The units of competency contained within this qualification are common with other qualifications and credit should be granted towards this qualification where competency has already been achieved.

Credit should also be granted towards this qualification where competency has been achieved in units of competency contained within relevant skill sets.

The units of competency in this qualification reflect competencies which are practiced within the industry and recognition of prior learning (RPL) should be granted where there is sufficient evidence of competency from work-based experience.

Pathways from the qualification

Further qualification pathways from this qualification include MSA30610 Certificate III in Recreational Vehicle Manufacture.

Additional qualification advice

MSA21108 Certificate II in Competitive Manufacturing and MSA30107 Certificate III in Process Manufacturing are available for team leaders or others who need a more generalist qualification covering the application of good manufacturing practice and lean principles.

Licensing considerations

Units of competency in this qualification provide the underpinning knowledge and skills for various required licenses. Local regulations should be checked for details.

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Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification**
Communication	• Accessing and interpreting standardised documentation • Completing all reporting as required • Asking questions to increase understanding about workplace procedures • Reading and interpreting instructions • Responding to information • Accessing and using communication tools and equipment • Applying numeracy skills to work procedures
Teamwork	• Working effectively with others • Sharing information with peers • Understanding role of individual within team process • Seeking assistance with work operations as required
Problem solving	• Recognising common problems and report inconsistencies • Monitoring the job and making improvements • Responding to routine problems • Recommending improvements
Initiative and enterprise	• Taking correct action and following procedures • Recommending changes and improvements • Taking action to make improvements • Adopting changes in accordance with procedures
Planning and organising	• Planning own work • Organising processes, tools and materials • Monitoring own work outcomes

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• Organising and planning activities • Collecting and organising information for work activity
Self-management	• Conducting all activities according to safety standards • Maintaining housekeeping standards • Achieving planned outcomes within time constraints • Monitoring own work performance • Assessing own work • Seeking assistance where appropriate
Learning	• Asking questions to aid learning • Identifying own skill requirements • Asking questions to ensure understanding of own work requirements
Technology	• Using equipment and/or or information technology • Identifying equipment appropriate for job • Using simple measuring devices • Collecting and applying data and information from technology

Packaging Rules

Packaging Rules

To be awarded the Certificate II in Recreational Vehicle Manufacture competency must be achieved in **fourteen** (**14**) units of competency:

- **three** (**3**) core units of competency
- **eleven** (**11**) elective units of competency, as specified below:

  - a minimum of **seven** (**7**) units of competency must be selected from Group A
  - the balance of units, to a maximum of **four** (**4**) may be selected from:
    - units not previously selected from Group A
    - Group B units listed below.

Note: Up to **four** (**4**) elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, as specified in Groups A and B.

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Note: Where prerequisite units are identified, they must be counted in the total number of units required for completion of the qualification.

Core units of competency

Unit code	Unit title	Prerequisites
MSAENV272B	Participate in environmentally sustainable work practices	
MSAPMOHS200A	Work safely	
MSAPMSUP102A	Communicate in the workplace	

Elective units of competency

Group A

Unit code	Unit title	Prerequisites
AUMGTT001	Apply trim to vehicle components	
AURETR2010	Fabricate, test and repair wiring harnesses and looms	
AURTTA3017	Carry out vehicle safety and roadworthy inspection	
AURVTN2005	Remove and fit protector mouldings, transfers and decals	
AURVTP2007	Apply paint touch-up techniques	
AURVTT3015	Fabricate canvas products	
AURVTT3016	Fabricate frame structures	
AURVTT3019	Fabricate and install canopies and curtains	
AURVTG3011	Install side windows	
MEM03001B	Perform manual production assembly	

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Unit code	Unit title	Prerequisites
MEM03003B	Perform sheet and plate assembly	*
MEM05005B	Carry out mechanical cutting	*
MEM05012C	Perform routine manual metal arc welding	
MEM05050B	Perform routine gas metal arc welding	
MEM05052A	Apply safe welding practices	
MEM07015B	Set computer controlled machines/processes	*
MEM07024B	Operate and monitor machine/process	
MEM07028B	Operate computer controlled machines/processes	*
MEM10002B	Terminate and connect electrical wiring	*
MEM11010B	Operate mobile load shifting equipment	
MEM12002B	Perform electrical/electronic measurement	
MEM12006C	Mark off/out (general engineering)	*
MEM12023A	Perform engineering measurements	
MEM18001C	Use hand tools	
MEM18002B	Use power tools/hand held operations	
MSAPMOPS101A	Make measurements	
MSARVS201A	Install LP gas systems in a recreational vehicle	
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate II.		

Group B

Unit code	Unit title	Prerequisites

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Unit code	Unit title	Prerequisites
MEM09002B	Interpret technical drawing	
MEM11011B	Undertake manual handling	
MEM14004A	Plan to undertake a routine task	
MEM15004B	Perform inspection	
MEM15024A	Apply quality procedures	
MSS402021A	Apply Just in Time procedures	
MSS402040A	Apply 5S procedures	
MSS402080A	Undertake root cause analysis	
MSAPMOHS220A	Provide initial first aid response	
MSAPMOPS212A	Use enterprise computers or data systems	
MSAPMSUP100A	Apply workplace procedures	
MSAPMSUP101A	Clean workplace or equipment	
MSAPMSUP106A	Work in a team	
MSAPMSUP280A	Manage conflict at work	
MSAPMSUP291A	Participate in continuous improvement	
MSARVS301A	Develop and update caravan industry knowledge	
MSARVG201A	Tow a recreational vehicle safely	
MSARVT201A	Apply technical knowledge of recreational vehicle manufacturing to work activities	
PMBPROD221B	Operate rotational moulding equipment	
SIRXSLS002A	Advise on products and services	
TLID2010A	Operate a forklift	
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate II.		

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MSA30107 Certificate III in Process Manufacturing

Modification History

Release 5 - Imported elective units updated

Release 4 - Imported unit updated. MEM09003B replaced by MEM09204A. Prerequisites replaced by an asterisk. Equivalent.

Release 3 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package.

Release 2 - Imported unit codes updated. TAADEL301C replaced by TAEDEL301A.

Description

The Certificate III in Process Manufacturing is intended for advanced production workers who use a range of equipment and provide support functions directly related to producing products. They would undertake more advanced roles, working in accordance with the operating procedures and would apply their knowledge to anticipate problems and solve a range of foreseen and unforeseen problems.

This qualification is for:

- production support workers - people working in manufacturing and filling the vital production support roles but who may not have the opportunity to develop competency in sufficient technical units related directly to producing products
- those employees who operate across more than one category within process manufacturing or 'specialised processes' and elsewhere when required.

It is designed for use across the three process manufacturing sectors:

- chemical, hydrocarbons and oil refining
- plastics, rubber and cablemaking
- manufactured mineral products.

Licensing considerations

There are no specific licenses that relate to this qualification. However, some units in this qualification may have licensing or regulatory requirements depending on the work context. Local regulations should be checked for details.

Pathways Information

Not applicable.

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Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

MSA30107 Certificate III in Process Manufacturing

The following table contains a summary of the Employability Skills required by the process manufacturing industries for this qualification. The Employability Skills facets described here are broad industry requirements that may vary depending on qualification packaging options.

Due to the high proportion of electives required by this qualification, the industry/enterprise requirements described above for each Employability Skill are representative of the industry in general and may not reflect specific job roles. Learning and assessment strategies for this qualification should be based on the requirements of the units of competency for this qualification.

Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• complete logs and reports • use technical information and manufacturer's information • collect, analyse and organise information • communicate ideas and information • effective use of workplace documentation • maintain workplace records
Teamwork	• identify and describe own role and role of others • work within a team • resolve conflicts between team members • use teamwork strategies
Problem solving	• recognise a problem or a potential problem • determine problems needing priority action • refer problems outside area of responsibility to appropriate person, with possible causes • seek information and assistance as required to solve problems • solve problems within area of responsibility • follow through items initiated until final resolution has occurred

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• identify and isolate faults in equipment • use a range of formal problem solving techniques
Initiative and enterprise	• identify the most appropriate equipment • make adjustments to improve equipment performance • anticipate the impact of the process on the product • determine problems needing action • recommend required action • report problems outside area of responsibility • distinguish between causes of faults
Planning and organising	• plan own work requirements • plan scope of equipment checks • plan and organise activities • identify tasks to achieve team goals • organise allocation of tasks • monitor completion of allocated tasks • develop and adjust a production schedule
Self-management	• plan own work requirements from production requests • operate within appropriate time constraints and work standards • select and use appropriate equipment, materials, processes and procedures • plan to ensure effective production • apply workplace procedures • identify resource requirements, document and monitor • recognise limitations and seek timely advice
Learning	• ask questions to gain information • identify sources of information to expand knowledge and understanding • participate in improvement procedures • participate in development of continuous improvement strategies
Technology	• operation and adjustment of processes • start up and shut down equipment • set up equipment • monitor product/process quality • function and operating principles of equipment, machine components • maintain computer based workplace records

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Packaging Rules

Packaging Rules

To be awarded the Certificate III in Process Manufacturing, competency must be achieved in **twenty one** (**21**) units of competency.

- **four** (**4**) core units of competency
- **seventeen** (**17**) elective units of competency, six (6) of which can be selected from this Training Package, other endorsed Training Packages and accredited courses, as specified below.

Note: Where prerequisite units are identified they must be counted in the total number of units required for completion of the qualification.

Core units of competency

- Select all **four** (**4**) units from the following list.

Unit code	Unit title
MSAENV272B	Participate in environmentally sustainable work practices
MSS402051A	Apply quality standards
MSAPMOHS200A	Work safely
MSAPMSUP210A	Process and record information

Group A - Elective units

- Select a minimum of **five** (**5**) units from the following list.

Unit code	Unit title	Prerequisites
Support units		
MEM03001B	Perform manual production assembly	
MEM03006B	Set assembly stations	
MEM11005B	Pick and process order	

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Unit code	Unit title	Prerequisites
MEM11006B	Perform production packaging	
MEM11007B	Administer inventory procedures	
MEM12023A	Perform engineering measurements	
MEM15001B	Perform basic statistical quality control	
MEM15003B	Use improvement processes in team activities	
MEM15004B	Perform inspection	
MSS402002A	Sustain process improvements	
MSS402020A	Apply quick changeover procedures	
MSS402050A	Monitor process capability	
MSS402060A	Use planning software systems in operations	
MSS402080A	Undertake root cause analysis	
MSAPMOHS300A	Facilitate the implementation of OHS for a work group	*
MSAPMPER300C	Issue work permits	*
MSAPMPER400A	Coordinate permit process	*
MSAPMSUP300A	Identify and implement opportunities to maximise production efficiencies	
MSAPMSUP301A	Apply HACCP to the workplace	
MSAPMSUP303A	Identify equipment faults	
MSAPMSUP309A	Maintain and organise workplace records	
MSAPMSUP310A	Contribute to the development of plant documentation	
MSAPMSUP330A	Develop and adjust a production schedule	
MSAPMSUP382A	Provide coaching/mentoring in the workplace	
MSAPMSUP383A	Facilitate a team	

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Unit code	Unit title	Prerequisites
MSAPMSUP390A	Use structured problem solving tools	
MSL973001A	Perform basic tests	
TAEDEL301C	Provide work skill instruction	
Technical units		
MEM09002B	Interpret technical drawing	
MEM09204A	Produce basic engineering detail drawings	*
MSAPMOPS363A	Organise on site work	
A maximum of two (2) relevant units may be selected from this Training Package, other endorsed Training Packages and accredited courses, where those units are available for inclusion at Certificates III or IV.		

Group B - Other electives

- Select a maximum of **twelve** (**12**) units from the following list.

Unit code	Unit title
Support units	
LMTGN2008B	Coordinate work of team/section
MEM13003B	Work safely with industrial chemicals and materials
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related environment
MEM16008A	Interact with computing technology
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MSS402021A	Apply Just in Time procedures
MSS402030A	Apply cost factors to work practices

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Unit code	Unit title
MSS402040A	Apply 5S procedures
MSAPMOHS100A	Follow OHS procedures
MSAPMOHS110A	Follow emergency response procedures
MSAPMOHS205A	Control minor incidents
MSAPMOHS210A	Undertake first response to non-fire incidents
MSAPMOHS212A	Undertake first response to fire incidents
MSAPMOHS216A	Operate breathing apparatus
MSAPMOHS217A	Gas test atmospheres
MSAPMOHS220A	Provide initial First Aid response
MSAPMOPS100A	Use equipment
MSAPMOPS101A	Make measurements
MSAPMOPS102A	Perform tasks to support production
MSAPMPER200C	Work in accordance with an issued permit
MSAPMPER201A	Monitor and control work permits
MSAPMPER202A	Observe permit work
MSAPMPER205C	Enter confined space
MSAPMSUP100A	Apply workplace procedures
MSAPMSUP101A	Clean workplace or equipment
MSAPMSUP102A	Communicate in the workplace
MSAPMSUP106A	Work in a team
MSAPMSUP172A	Identify and minimise environmental hazards
MSAPMSUP200A	Achieve work outcomes
MSAPMSUP201A	Receive or despatch goods
MSAPMSUP204A	Pack products or materials

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Unit code	**Unit title**
MSAPMSUP205A	Transfer loads
MSAPMSUP230A	Monitor process operations
MSAPMSUP240A	Undertake minor maintenance
MSAPMSUP273A	Handle goods
MSAPMSUP280A	Manage conflict at work
MSAPMSUP291A	Participate in continuous improvement
MSAPMSUP292A	Sample and test materials and product
PMBHAN103C	Shift materials safely by hand
TLID2010A	Operate a forklift
RIIRIS201B	Conduct local risk control
Technical units	
FPICOT2238A	Cut materials with a hand-held chainsaw
MSAPMOPS200A	Operate equipment
MSAPMOPS212A	Use enterprise computers or data systems
A maximum of four (4) relevant units may be chosen from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate II.	

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MSA30208 Certificate III in Manufacturing Technology

Modification History

Version 4 - MEM elective imported units replaced by current versions. Equivalent.

Version 3 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package.

Version 2 - Imported unit codes updated.

Description

This qualification is suitable for delivery as part of a one-year Technology Cadetship, or can be undertaken through an Australian Apprenticeship arrangement.

This qualification has seven specialist streams available. These are:

- CAD/drafting
- Manufacturing operations
- Laboratory operations
- Technical officer
- Metallurgy
- Polymer technology
- Structural steel detailing.

Each stream offers an opportunity for significant choice in electives and each stream requires the same core units to be completed.

Note:

- The minimum requirements for the Certificate III in Manufacturing Technology can also be met by holders of the *Certificate III in Engineering - Technician* from the Metal and Engineering Training Package.
-

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

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Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

MSA30208 Certificate III in Manufacturing Technology

The following table contains a summary of the employability skills as identified by manufacturing technology related industries for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that reflect skill requirements for this level.

Employability skill	**Industry/enterprise requirements for this qualification include**:
Communication	• use communication technologies efficiently • communicate production abnormalities, documentation and test results • demonstrate effective and appropriate communication and interpersonal skills when dealing with people from a range of backgrounds • read, interpret and communicate work related documents • communicate with all team members
Teamwork	• work cooperatively with people of different ages, gender, race or religion • liaise with and provide support to other team members • work as part of a team • identify team performance required to meet customer needs • provide leadership to others in the team • encourage the sharing of information between team members • plan and support team activities
Problem solving	• identify and report problems and make contributions to their solution • investigate problem causes • implement changes • examine equipment for damage, missing components or other defects

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Employability skill	**Industry/enterprise requirements for this qualification include**:
	• identify and promptly address problems or issues • assess quality of work according to specifications • determine effective work practices • problem solve machine operational requirements
Initiative and enterprise	• seek and provide feedback on procedures • gather and analyse information • record information on the quality and other indicators of production performance • identify and implement simple process improvements • coordinate work activities and manufacturing processes • use analytical and decision making skills
Planning and organising	• identify hazards and implement appropriate hazard control measures • organise self and others to meet production schedules • sequence work to maximise safety and productivity • select and use appropriate tools and equipment • apply time management skills to ensure work flow
Self management	• plan own work requirements from production requests • operate within appropriate time constraints and work standards • select and use appropriate equipment, materials, processes and procedures • plan to ensure effective production • apply workplace procedures • identify resource requirements, document and monitor • recognise limitations and seek timely advice
Learning	• ask questions to gain information • identify sources of information to expand knowledge and understanding • participate in improvement procedures • participate in development of continuous improvement strategies
Technology	• operate and adjust processes • start up and shut down equipment • set up equipment • monitor product/process quality • function and operating principles of equipment, machine components • maintain computer based workplace records

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Packaging Rules

Packaging Rules

To be awarded a Certificate III in Manufacturing Technology, competency must be achieved in **eleven** (**11**) units of competency:

- **three** (**3**) core units of competency
- **eight** (**8**) elective units of competency chosen as described below.

Core units

The following **three** (**3**) units must be chosen.

Unit code	Unit title
MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment
MSS402051A	Apply quality standards
MSAENV272B	Participate in environmentally sustainable work practices

Prerequisites

Note that elective units marked with an asterisk have one or more prerequisite requirements. The prerequisites for these units are to be counted in the total number of units required in the elective group. Please refer to the individual units for details.

Elective units

Group A - specialist streams

Choose **eight** (**8**) elective units as specified for a specialist stream.

Note:

- All units from each specialist stream are available in Group B as General Electives.

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- A maximum of two general elective units may also be chosen from other qualifications in this Training Package, other endorsed Training Packages and accredited courses.

CAD/drafting specialist stream

Select **eight** (**8**) elective units:

- a minimum of **six** (**6**) from the list below
- the balance may be chosen from Group B General Electives

Unit code	Unit title	Prerequisites
AUM4003A	Interpret customer requirements	
LMTGN4002A	Participate in product engineering	
MEM12024A	Perform computations	
MEM16006A	Organise and communicate information	
MEM16008A	Interact with computing technology	
MEM30031A	Operate computer-aided design (CAD) systems to produce basic drawing elements	
MEM30032A	Produce basic engineering drawings	
MEM30033A	Use computer-aided design (CAD) to create and display 3-D models	*
MEM30005A	Calculate force systems within simple beam structures	*
MEM30006A	Calculate stresses in simple structures	*
MEM30007A	Select common engineering materials	
MEM30008A	Apply basic economic and ergonomic concepts to evaluate engineering applications	
MEM30010A	Set up basic hydraulic circuits	
MEM30011A	Set up basic pneumatic circuits	
MEM30013A	Assist in the preparation of a basic workplace layout	
MEM30025A	Analyse a simple electrical system circuit	*

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Manufacturing operations specialist stream

Select **eight** (**8**) elective units as follows:

- a minimum of **six** (**6**) from the list below
- the balance may be chosen from Group B General Electives

Unit code	Unit title	Prerequisites
FDFOP2005A	Work in a socially diverse environment	
MEM15001B	Perform basic statistical quality control	
MEM16006A	Organise and communicate information	
MEM16008A	Interact with computing technology	
MEM30014A	Apply basic just in time systems to the reduction of waste	
MEM30015A	Develop recommendations for basic set up time improvements	
MEM30016A	Assist in the analysis of a supply chain	
MEM30017A	Use basic preventative maintenance techniques and tools	
MEM30018A	Undertake basic process planning	
MEM30019A	Use resource planning software systems in manufacturing	*
MEM30020A	Develop and manage a plan for a simple manufacturing related project	
MEM30021A	Prepare a simple production schedule	
MEM30023A	Prepare a simple cost estimate for a manufactured product	
MEM30024A	Participate in quality assurance techniques	*
MSS402001A	Apply competitive systems and practices	

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Unit code	Unit title	Prerequisites
MSS402002A	Sustain process improvements	
MSS402020A	Apply quick changeover procedures	
MSS402030A	Apply cost factors to work practices	
MSS402031A	Interpret product costs in terms of customer requirements	
MSS402050A	Monitor process capability	
MSS402060A	Use planning software systems in operations	
MSS402061A	Use SCADA systems in operations	
MSS402080A	Undertake root cause analysis	
MSS403002A	Ensure process improvements are sustained	
MSS403030A	Improve cost factors in work practices	

Laboratory operations specialist stream

Select **eight** (**8**) elective units:

- a minimum of **six** (**6**) from the list below
- the balance may be chosen from Group B General Electives

Unit code	Unit title	Prerequisites
LMTGN4016A	Contribute to the development of products or processes	
MEM15001B	Perform basic statistical quality control	
MEM16006A	Organise and communicate information	
MEM16008A	Interact with computing technology	
MEM30024A	Participate in quality assurance techniques	*

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Unit code	Unit title	Prerequisites
MSL913001A	Communicate with other people	
MSL913002A	Plan and conduct laboratory/field work	
MSL922001A	Record and present data	
MSL933001A	Maintain the laboratory/field workplace fit for purpose	
MSL933002A	Contribute to the achievement of quality objectives	
MSL933003A	Apply critical control point requirements	
MSL934002A	Apply quality system and continuous improvement processes	
MSL943001A	Work safely with instruments that emit ionising radiation	
MSL943002A	Participate in laboratory/field workplace safety	
MSL952001A	Collect routine site samples	
MSL952002A	Handle and transport samples or equipment	
MSL953001A	Receive and prepare samples for testing	
MSL954001A	Obtain representative samples in accordance with sampling plan	
MSL963001A	Operate basic handblowing equipment	
MSL963002A	Repair glass apparatus using simple glassblowing equipment	
MSL973001A	Perform basic tests	
MSL973002A	Prepare working solutions	
MSL973003A	Prepare culture media	
MSL973004A	Perform aseptic techniques	
MSL973005A	Assist with fieldwork	
MSL973006A	Prepare trial batches for evaluation	

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Unit code	Unit title	Prerequisites
MSL973007A	Perform microscopic examination	

Technical officer specialist stream

Select **eight** (**8**) elective units:

- a minimum of **six** (**6**) from the list below
- the balance may be chosen from Group B General Electives

Unit code	Unit title	Prerequisites
LMTGN4016A	Contribute to the development of products or processes	
MEM15001B	Perform basic statistical quality control	
MEM16006A	Organise and communicate information	
MEM16008A	Interact with computing technology	
MEM30007A	Select common engineering materials	
MEM30008A	Apply basic economic and ergonomic concepts to engineering designs and applications	
MEM30009A	Contribute to the design of basic mechanical systems	*
MEM30010A	Set up basic hydraulic circuits	
MEM30011A	Set up basic pneumatic circuits	
MEM30013A	Assist in the design of basic workplace layout	
MEM30016A	Assist in the analysis of a supply chain	
MEM30017A	Use basic preventative maintenance techniques and tools	
MEM30018A	Undertake basic process planning	
MEM30019A	Use resource planning software systems in	*

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Unit code	Unit title	Prerequisites
	manufacturing	
MEM30020A	Develop and manage a plan for a simple manufacturing related project	
MEM30022A	Undertake supervised procurement activities	
MEM30023A	Prepare a simple cost estimate for a manufactured product	
MEM30024A	Participate in quality assurance techniques	
MSS402031A	Interpret product costs in terms of customer requirements	
MSS402060A	Use planning software systems in operations	
MSS402061A	Use SCADA systems	
MSS402080A	Undertake root cause analysis	
MSS403032A	Analyse manual handling processes	

Metallurgy specialist stream

Select **eight** (**8**) elective units:

- a minimum of **five** (**5**) from the two groups below
- the balance may be chosen from Group B General Electives
-

Metallurgy group 1

Choose at least three (3) units from this list.

Unit code	Unit title	Prerequisites
MSATCM301A	Test the mechanical properties of materials	
MSATCM302A	Monitor basic ferrous melting and casting processes	
MSATCM303A	Monitor basic non-ferrous melting and casting	

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Unit code	Unit title	Prerequisites
	processes	
MSATCM304A	Interpret basic binary phase diagrams	
MSATCM305A	Demonstrate basic knowledge of casting operations	

Metallurgy group 2

Choose at least two (2) units from this list.

Unit code	Unit title	Prerequisites
MEM09002B	Interpret technical drawing	
MEM13003B	Work safely with industrial chemicals	
MEM13004B	Work safely with molten metals/glass	
MEM16008A	Interact with computing technology	
MEM30007A	Select common engineering materials	*

Polymer technology specialist stream

Select **eight** (**8**) elective units:

- a minimum of **six** (**6**) from the list below
- the balance may be chosen from Group B General Electives

Note that either PMBPREP301C or PMBPREP303C may be chosen, but not both.

Unit code	Unit title	Prerequisites
MSAPMSUP303A	Identify equipment faults	
PMAOPS350B	Match and adjust colour	

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Unit code	Unit title	Prerequisites
PMBPREP206C	Prepare materials to formulae	
PMBPREP301C	Set up and prepare for production	
PMBPREP303C	Set up equipment for continuous production	
PMBPREP304C	Set a die	
PMBPROD235C	Use materials and process knowledge to complete work operations	
PMBTECH301B	Use material and process knowledge to solve problems	*
PMBTECH302A	Modify existing compounds	
PMBTECH303A	Make minor modifications to products	
MSL973001A	Perform basic tests	
	Up to two (2) relevant units may be chosen from the **production** units available at Certificate III in the Plastics, Rubber & Cablemaking Training Package (PMB07), or its endorsed replacement.	

Structural steel detailing specialist stream

Select **eight** (**8**) elective units:

- a minimum of **six** (**6**) from the list below
- the balance may be chosen from Group B General Electives

Unit code	Unit title	Prerequisites
MSATCS301A	Interpret architectural and engineering design specifications for structural steel detailing	*
MSATCS302A	Detail bolts and welds for structural steelwork connections	*
MEM05051A	Select welding processes	

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Unit code	Unit title	Prerequisites
MEM09002B	Interpret technical drawing	
MEM16006A	Organise and communicate information	
MEM16008A	Interact with computing technology	
MEM30031A	Operate computer-aided design (CAD) system to produce basic engineering elements	
MEM30032A	Produce basic engineering drawings	
MEM30033A	Use computer-aided design (CAD) to create and display 3-D models	*

Group B - General electives

The balance of units for each specialist stream may be chosen from this list as specified below:

CAD/drafting:	Up to two units
Manufacturing operations:	Up to two units
Laboratory operations:	Up to two units
Technical officer:	Up to two units
Metallurgy:	Up to three units
Polymer technology:	Up to two units
Structural steel detailing:	Up to two units

Unit code	Unit title	Prerequisites
AUM4003A	Interpret customer requirements	
FDFOP2005A	Work in a socially diverse environment	

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Unit code	Unit title	Prerequisites
LMTGN4002A	Participate in product engineering	
LMTGN4016A	Contribute to the development of products or processes	
MEM05051A	Select welding processes	
MEM09002B	Interpret technical drawing	
MEM12024A	Perform computations	
MEM13003B	Work safely with industrial chemicals	
MEM13004B	Work safely with molten metals/glass	
MEM15001B	Perform basic statistical quality control	
MEM16006A	Organise and communicate information	
MEM16008A	Interact with computing technology	
MEM30031A	Use computer-aided design (CAD) systems to produce basic drawing elements	
MEM30032A	Produce basic engineering drawings	
MEM30033A	Use computer-aided design (CAD) to create and display 3-D models	*
MEM30005A	Calculate force systems within simple beam structures	*
MEM30006A	Calculate stresses in simple structures	*
MEM30007A	Select common engineering materials	
MEM30008A	Apply basic economic and ergonomic concepts to engineering designs and applications	
MEM30009A	Contribute to the design of basic mechanical systems	*
MEM30010A	Set up basic hydraulic circuits	
MEM30011A	Set up basic pneumatic circuits	
MEM30012A	Apply mathematical techniques in a manufacturing engineering or related environment	

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Unit code	Unit title	Prerequisites
MEM30013A	Assist in the design of basic workplace layout	
MEM30014A	Apply basic just in time systems to the reduction of waste	
MEM30015A	Develop recommendations for basic set up time improvements	
MEM30016A	Assist in the analysis of a supply chain	
MEM30017A	Use basic preventative maintenance techniques and tools	
MEM30018A	Undertake basic process planning	
MEM30019A	Use resource planning software systems in manufacturing	*
MEM30020A	Develop and manage a plan for a simple manufacturing related project	
MEM30021A	Prepare a simple production schedule	
MEM30022A	Undertake supervised procurement activities	
MEM30023A	Prepare a simple cost estimate for a manufactured product	
MEM30024A	Participate in quality assurance techniques	
MEM30025A	Analyse a simple electrical system circuit	*
MSS402001A	Apply competitive systems and practices	
MSS402002A	Sustain process improvements	
MSS402020A	Apply quick changeover procedures	
MSS402030A	Apply cost factors to work practices	
MSS402031A	Interpret product costs in terms of customer requirements	
MSS402050A	Monitor process capability	
MSS402060A	Use planning software systems in operations	

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Unit code	Unit title	Prerequisites
MSS402061A	Use SCADA systems in operations	
MSS402080A	Undertake root cause analysis	
MSS403002A	Ensure process improvements are sustained	
MSS403030A	Improve cost factors in work practices	
MSS403032A	Analyse manual handling processes	
MSAPMSUP303A	Identify equipment faults	
MSATCM301A	Test the mechanical properties of materials	
MSATCM302A	Monitor basic ferrous melting and casting processes	
MSATCM303A	Monitor basic non-ferrous melting and casting processes	
MSATCM304A	Interpret basic binary phase diagrams	
MSATCM305A	Demonstrate basic knowledge of casting operations	
MSATCS301A	Interpret architectural and engineering design specifications for structural steel detailing	*
MSATCS302A	Detail bolts and welds for structural steelwork connections	*
MSL913001A	Communicate with other people	
MSL913002A	Plan and conduct laboratory/field work	
MSL922001A	Record and present data	
MSL933001A	Maintain the laboratory/field workplace fit for purpose	
MSL933002A	Contribute to the achievement of quality objectives	
MSL933003A	Apply critical control point requirements	
MSL934002A	Apply quality system and continuous improvement processes	
MSL943001A	Work safely with instruments that emit ionising radiation	

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Unit code	Unit title	Prerequisites
MSL943002A	Participate in laboratory/field workplace safety	
MSL952001A	Collect routine site samples	
MSL952002A	Handle and transport samples or equipment	
MSL953001A	Receive and prepare samples for testing	
MSL954001A	Obtain representative samples in accordance with sampling plan	
MSL963001A	Operate basic handblowing equipment	
MSL963002A	Repair glass apparatus using simple glassblowing equipment	
MSL973001A	Perform basic tests	
MSL973002A	Prepare working solutions	
MSL973003A	Prepare culture media	
MSL973004A	Perform aseptic techniques	
MSL973005A	Assist with fieldwork	
MSL973006A	Prepare trial batches for evaluation	
MSL973007A	Perform microscopic examination	
PMAOPS350B	Match and adjust colour	
PMBPREP206C	Prepare materials to formulae	
PMBPREP301C	Set up and prepare for production	
PMBPREP303C	Set up equipment for continuous production	
PMBPREP304C	Set a die	
PMBPROD235C	Use materials and process knowledge to complete work operations	
PMBTECH301B	Use material and process knowledge to solve problems	*

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Unit code	Unit title	Prerequisites
PMBTECH302A	Modify existing compounds	
PMBTECH303A	Make minor modifications to products	
	A maximum of **two** (2) general electives may be imported from other qualifications in this Training Package, other endorsed Training Packages and accredited courses where those units are available at Certificate III.	

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MSA30309 Certificate III in Surface Preparation and Coating Application

Modification History

Correction made to one prerequisite code.

Version 3 - Minor formatting. Imported unit coded updated.

Description

This qualification covers the skills and knowledge required to perform the wide range of surface preparation and protective coating application operations which occur across a range of typically heavy industry, ships and infrastructure.

Job roles/employment outcomes

The Certificate III in Surface Preparation and Coating Application has been developed as a trade level qualification for use in MSA07 Manufacturing Training Package. This qualification has been developed in response to an industry request. People with this qualification would be expected to work under routine only supervision, preparing surfaces and/or applying protective coatings in accordance with a provided technical specification. They would be expected to recognise situations where the intended approach was not appropriate/not working and take appropriate action to ensure the final result is satisfactory.

They may work in a manufacturer's factory or they may work as contractors on the site of the plant/ship/infrastructure.

Application

The sector typically prepares surfaces for initial application, or for the reapplication, of protective coatings. In these circumstances it also applies the protective coating which may be liquid or solid. This qualification relates to surface preparation **and** coating and coating units are required.

The surfaces being prepared are typically metal (usually ferrous) and may be structural or have other mechanical requirements.

People with this qualification may be expected to:

- abrasively blast clean surfaces to Australian Standard requirements and in accordance with the specification
- otherwise prepare surfaces for coating as required by the specification
- apply liquid protective surface coatings

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- apply solid polymer surface coatings (this is usually a specialised area).

This work may be undertaken:

- in a factory environment
- in an on-site, outdoors environment
- inside a vessel or other confined space
- outside a vessel or structure
- at heights
- some combination of these.

Training programs for this qualification are suitable to be undertaken as part of a formal training contract with an employer under an Australian Traineeship or Apprenticeship arrangement.

Pathways into the qualification

This qualification may be accessed by direct entry.

The units of competency contained within this qualification are common with other qualifications and credit should be granted towards this qualification where competency has already been achieved.

Credit should also be granted towards this qualification where competency has been achieved in units of competency contained within relevant skill sets. The skill set 'Confined Space Work Team Skill Set' was created in PMA08 Chemical, Hydrocarbons and Refining Training Package and is relevant to this qualification. Other skill sets have also been endorsed in MSA07 that relate to this qualification. Details are in 'Skill Sets in this Training Package'.

The units of competency in this qualification reflect competencies which are practiced within the industry and recognition should be granted where there is sufficient evidence of competency from work based experience.

Pathways from the qualification

Further qualification pathways from this qualification include MSA40108 Certificate IV in Manufacturing Technology, MEM40105 Certificate IV in Engineering or other relevant qualifications.

Additional qualification advice

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MSA41108 Certificate IV in Competitive Manufacturing is available for team leaders or others who need a more generalist qualification covering the application of good manufacturing practice and lean principles.

Licensing considerations

There are no specific licences that relate to this qualification. However, in some jurisdictions there may be licensing or regulatory requirements associated with the work. Local regulations should be checked for details.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification**
Communication	• maintain communication about multiple subjects and with multiple audiences • complete incident and other reports • use technical information and manufacturer information • collect, analyse and organise information • communicate ideas and information • use and contribute to workplace documentation • maintain workplace records
Teamwork	• identify and describe own role and role of others • work within a team • resolve conflicts between team members • teamwork strategies

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Problem solving	• recognise a problem or a potential problem • determine problems needing priority action • refer problems outside area of responsibility to appropriate person • identify appropriate theory base for problem • seek information and assistance as required to solve problems • solve problems within area of responsibility • follow through items initiated until final resolution has occurred • identify and isolate faults in equipment • use a range of formal problem solving techniques
Initiative and enterprise	• identify the most appropriate process conditions for equipment • determine problems needing action • recommend required action • report problems outside area of responsibility • distinguish between causes of faults
Planning and organising	• prioritise actions to achieve required outcomes • plan own work requirements and assist others to plan theirs • plan and organise activities • identify tasks to achieve team goals • organise allocation of tasks • monitor completion of allocated tasks • develop and adjust a production schedule
Self-management	• plan own work requirements from job requests • operate within appropriate time constraints and work standards • select and use appropriate equipment, materials, processes and procedures • plan to ensure effective production • apply standard procedures • identify resource requirements • recognise limitations and seek timely advice
Learning	• ask questions to gain information • identify sources of information to expand knowledge and understanding • participate in improvement procedures • participate in development of continuous improvement strategies • assist others develop competency
Technology	• operate and adjust equipment • start up and shut down equipment • set up equipment

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• monitor quality • function and operating principles of equipment • maintain workplace records

Packaging Rules

Packaging Rules

To be awarded the Certificate III in Surface Preparation and Coating Application competency must be achieved in **thirty one** (**31**) units of competency.

- **eleven** (**11**) core units of competency
- **twenty** (**20**) elective units of competency, five (5) of which may be selected from this Training Package, other endorsed Training Packages and accredited courses, as specified below.

Note: Where prerequisite units are identified they must be counted in the total number of units required for completion of the qualification.

Core units of competency

- Select all **eleven** (**11**) units of competency from the following list.

Unit Code	Title
MEM12023A	Perform engineering measurements
MEM12024A	Perform computations
MEM14004A	Plan to undertake a routine task
MEM14005A	Plan a complete activity
MEM15002A	Apply quality systems
MEM15024A	Apply quality procedures
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related

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Unit Code	Title
	environment
MEM16008A	Interact with computing technology
MSAENV272B	Participate in environmentally sustainable work practices
MSAPMOHS200A	Work safely

Elective units of competency

Group A - Surface Preparation

- Select a minimum of **three** (**3**) units from the following list.

Unit Code	Title	Prerequisite
MEM08002C	Pre-treat work for subsequent surface coating	MEM13003B
MEM08007B	Control surface finish production and finished product quality	
MEM08011B	Prepare surfaces using solvents and/or mechanical means	MEM13003B MEM18001C MEM18002B
MEM08012B	Prepare surfaces by abrasive blasting (basic)	MEM08016B MEM13003B
MEM08013B	Prepare surfaces by abrasive blasting (advanced)	MEM08012B MEM08016B MEM13003B
MEM08016B	Control blast coating by-products, materials and emissions	MEM13003B
MSAPMWJ301A	Operate a high pressure water jetting system	
PMBPROD248C	Prepare surfaces for coating	
One (**1**) relevant technical surface preparation unit which is available for inclusion at Certificate III may be chosen from this Training Package, other endorsed Training Packages		

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Unit Code	Title	Prerequisite
and accredited courses.		

Group B - Coating Application

- Select a minimum of **two** (**2**) units from the following list.

Unit Code	Title	Prerequisite
MEM08014B	Apply protective coatings (basic)	MEM13003B
MEM08015B	Apply protective coatings (advanced)	MEM08014B MEM13003B
MSAPMOPS201A	Cut polymer materials	
MSAPMOPS202A	Fabricate polymer materials	
PMBPROD241C	Lay up rubber lining or lag pulleys	
PMBPROD242A	Bond polymers to surfaces	
PMBPROD265C	Operate portable vulcanising equipment	
PMBPROD323C	Produce powder coated products	
PMBPROD375B	Vulcanise products using an autoclave	
One (**1**) relevant technical protective coating application unit which is available for inclusion at Certificate III may be chosen from this Training Package, other endorsed Training Packages and accredited courses.		

Group C - Other elective units

- Select a minimum of **three** (**3**) units from the following list.

Unit Code	Title	Prerequisite

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Unit Code	Title	Prerequisite
MEM11001C	Erect/dismantle scaffolding and equipment	MEM18001C
MEM11002C	Erect/dismantle complex scaffolding and equipment	MEM11001C MEM18001C
MEM11003B	Coordinate erection/dismantling of complex scaffolding/equipment	MEM11001C MEM11002C MEM18001C
MEM11004B	Undertake dogging	MEM18001C
MEM11010B	Operate mobile load shifting equipment	
MEM11011B	Undertake manual handling	
MEM11021B	Perform advanced operation of load shifting equipment	MEM11010B
MEM11022B	Operate fixed/moveable load shifting equipment	
MEM13001B	Perform emergency first aid	
MEM13003B	Work safely with industrial chemicals and materials	
MSAPMOHS216A	Operate breathing apparatus	
MSAPMOHS217A	Gas test atmospheres	
MSAPMPER200C	Work in accordance with an issued permit	
MSAPMPER202A	Observe permit work	
MSAPMPER205C	Enter confined space	MSAPMPER200C
MSAPMPER300C	Issue work permits	RIIRIS201B
RIIOHS204A	Work safely at heights	
RIIRIS201B	Conduct local risk control	

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Group D - Other elective units

- Select a minimum of **three** (**3**) units from the following list.

Unit Code	Title	Prerequisite
MEM07001B	Perform operational maintenance of machines/equipment	MEM18001C
MEM11012B	Purchase materials	
MEM11016B	Order materials	
MEM12001B	Use comparison and basic measuring devices	
MEM15003B	Use improvement processes in team activities	MEM16007A
MEM15004B	Perform inspection	
MEM15005B	Select and control inspection process and procedures	MEM15004B
MEM16002C	Conduct formal interviews and negotiations	
MEM16005A	Operate as a team member to conduct manufacturing, engineering or related activities	
MEM16011A	Communicate with individuals and small groups	MEM16006A
MEM16013A	Operate in a self directed team	MEM16007A
MEM17001B	Assist in the development and delivery of training in the workplace	
MEM17003A	Assist in the provision of on the job training	
MEM18001C	Use hand tools	
MEM18002B	Use power tools/hand held operations	
MSAPMOPS301A	Treat corrosion	
MSAPMOPS363A	Organise on site work	
MSAPMSUP100A	Apply workplace procedures	

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Unit Code	Title	Prerequisite
MSAPMSUP303A	Identify equipment faults	
MSAPMSUP390A	Use structured problem solving tools	
MSAPMWJ201A	Use high pressure water jetting equipment	

Group E - Balance of units

The balance of units, to a maximum of **nine** (**9**), may be chosen from any combination of:

- units from Groups A, B, C and D above, not already selected
- up to **three** (**3**) relevant units can be selected from this Training Package, other endorsed Training Packages and accredited courses, where those units are available for inclusion at Certificate III.
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MSA30510 Certificate III in Recreational Vehicle Service and Repair

Modification History

Release 5 - Imported elective unit updated to current release

Release 4 - AU elective imported units replaced by current versions. Prerequisites replaced by an asterisk. Equivalent.

Release 3 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package. Imported unit version code updated.

Release 2 - Imported unit code updated.

Description

This qualification covers the skills and knowledge required to perform the wide range of service and repair tasks performed on recreational vehicles.

Job roles/employment outcomes

The Certificate III in Recreational Vehicle Service and Repair has been developed as a trade level qualification for use in MSA07 Manufacturing Training Package. This qualification has been developed in response to an industry request. People with this qualification would be expected to work under supervision servicing and repairing recreational vehicles, including:

- motor homes
- caravans
- camper trailers
- slide-ons
- fifth wheelers

to meet Australian requirements, such as road worthiness and the Australian Design Rule (ADR). They will analyse the service/repair requirements and then carry them out.

They may work in a service and repair facility or a manufacturer's factory undertaking warranty work. Work may be for an insurance claim, modifying an existing recreational vehicle or undertaking routine servicing.

Application

The sector typically services and repairs any recreational vehicle as required. This may apply to the recreational vehicle body, fittings and running gear. It may be in response to a road (or other) accident, hail damage, vehicle modification or routine servicing. They may also specify and access outside specialist services, for example, for spray painting or licence requirements.

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Recreational vehicles may be made from a frame (timber, aluminium or steel) and skin (aluminium or fibre composite) or a manufactured wall panel or some other technology. They are typically mounted on a steel chassis. Fittings are typically timber/particle board but may be any other suitable material.

People with this qualification may be expected to:

- carry out insurance repairs
- carry out other repairs
- work under warranty
- undertake modifications/refits to the recreational vehicle
- undertake routine servicing
- prepare a recreational vehicle for sale/resale.

This work will generally be undertaken in a workshop environment.

Training programs for this qualification are suitable to be undertaken as part of a formal training contract with an employer under an Australian Traineeship or Apprenticeship arrangement.

Pathways into the qualification

This qualification may be accessed by direct entry.

The units of competency contained within this qualification are common with other qualifications and credit should be granted towards this qualification where competency has already been achieved.

Credit should also be granted towards this qualification where competency has been achieved in units of competency contained within relevant skill sets.

The units of competency in this qualification reflect competencies which are practiced within the industry and recognition of prior learning (RPL) should be granted where there is sufficient evidence of competency from work-based experience.

Pathways from the qualification

Further qualification pathways from this qualification include MSA40510 Certificate IV in Recreational Vehicles.

Additional qualification advice

MSA41108 Certificate IV in Competitive Manufacturing is available for team leaders or others who need a more generalist qualification covering the application of good manufacturing practice and lean principles.

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Licensing considerations

Units of competency in this qualification provide the underpinning knowledge and skills for various required licenses. Local regulations should be checked for details.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification**
Communication	• Maintaining communication about multiple subjects and with multiple audiences • Completing incident and other reports • Using technical information and manufacturer information • Collecting, analysing and organising information • Communicating ideas and information • Using and contributing to workplace documentation • Maintaining workplace records
Teamwork	• Identifying and describing own role and role of others • Working within a team • Resolving conflicts between team members • Using teamwork strategies
Problem solving	• Recognising problems or potential problems • Determining problems needing priority action • Referring problems outside area of responsibility to appropriate person with possible causes • Identifying appropriate theory base for problem

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• Seeking information and assistance as required to solve problems • Solving problems within area of responsibility • Following through items initiated until final resolution has occurred • Identifying and isolating faults in equipment • Using a range of formal problem-solving techniques
Initiative and enterprise	• Identifying the most appropriate process conditions for equipment • Determining problems needing action • Recommending required action • Reporting problems outside area of responsibility • Distinguishing between causes of faults
Planning and organising	• Prioritising actions to achieve required outcomes • Planning own work requirements and assisting others to plan theirs • Planning and organising activities • Identifying tasks to achieve team goals • Organising allocation of tasks • Monitoring completion of allocated tasks • Developing and adjusting a production schedule
Self-management	• Planning own work requirements from job requests • Operating within appropriate time constraints and work standards • Selecting and using appropriate equipment, materials, processes and procedures • Planning to ensure effective production • Applying standard procedures • Identifying, documenting and monitoring resource requirements • Recognising limitations and seeking timely advice
Learning	• Asking questions to gain information • Identifying sources of information to expand knowledge and understanding • Participating in improvement procedures • Participating in development of continuous improvement strategies • Helping others develop competency
Technology	• Operating and adjusting equipment • Starting up and shutting down equipment • Setting up equipment

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• Monitoring quality • Understanding function and operating principles of equipment • Maintaining workplace records

Packaging Rules

Packaging Rules

To be awarded the Certificate III in Recreational Vehicle Service and Repair competency must be achieved in **twenty two** (**22**) units of competency:

- **three** (**3**) core units of competency
- **nineteen** (**19**) elective units of competency, as specified below:
  - a minimum of **thirteen** (**13**) units of competency must be selected from Group A
  - the balance of units, to a maximum of **six** (**6**) may be selected from:
    - units not previously selected from Group A
    - Group B units listed below.

Note: Up to **four** (**4**) elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, as specified in Groups A and B.

Note: Where prerequisite units are identified, they must be counted in the total number of units required for completion of the qualification.

Core units of competency

Unit code	Unit title	Prerequisites
MSAENV272B	Participate in environmentally sustainable work practices	
MSAPMOHS200A	Work safely	
MSAPMSUP102A	Communicate in the workplace	

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Elective units of competency

Group A

Unit code	Unit title	Prerequisites
AUMGTT001	Apply trim to vehicle components	
AURETR2015	Inspect and service batteries	
AURETR2012	test and repair basic electrical circuits	
AURETR2010	Fabricate, test and repair wiring harnesses and looms	
AURETB3001	Repair electric braking systems	
AURTTB2001	Inspect and service braking systems	
AURTTD2004	Inspect and service suspension systems	
AURTTJ2002	Remove and refit wheel hubs and associated brake components	
AURTTA3017	Carry out vehicle safety and roadworthy inspection	
AURVTN2005	Remove and fit protector mouldings, transfers and decals	
AURVTP2007	Apply paint touch-up techniques	
AURVTS3004	Repair fibreglass and composite material components	
AURTTY3001	Repair chassis, frame and associated components	
AURVTT3015	Fabricate canvas products	
AURVTT3016	Fabricate frame structures	
AURVTT3019	Fabricate and install canopies and curtains	
AURVTG3011	Install side windows	

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Unit code	Unit title	Prerequisites
MEM05005B	Carry out mechanical cutting	*
MEM05012C	Perform routine manual metal arc welding	
MEM05050B	Perform routine gas metal arc welding	
MEM10002B	Terminate and connect electrical wiring	*
MEM12002B	Perform electrical/electronic measurement	
MEM12023A	Perform engineering measurements	
MEM18001C	Use hand tools	
MEM18002B	Use power tools/hand held operations	
MEM18038B	Maintain wheels and tyres	*
MEM18045B	Fault find/repair electrical equipment/components up to 250 volts single phase supply	*
MSAPMOPS101A	Make measurements	
MSARVS202A	Repair/service LP gas systems in a recreational vehicle	
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate III.		

Group B

Unit code	Unit title	Prerequisites
MEM09002B	Interpret technical drawing	
MEM11011B	Undertake manual handling	
MEM14004A	Plan to undertake a routine task	
MEM15024A	Apply quality procedures	
MSS402021A	Apply Just in Time procedures	

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Unit code	Unit title	Prerequisites
MSS402040A	Apply 5S procedures	
MSS402080A	Undertake root cause analysis	
MSAPMOHS220A	Provide initial first aid response	
MSAPMOPS212A	Use enterprise computers or data systems	
MSAPMSUP100A	Apply workplace procedures	
MSAPMSUP101A	Clean workplace or equipment	
MSAPMSUP106A	Work in a team	
MSAPMSUP280A	Manage conflict at work	
MSAPMSUP291A	Participate in continuous improvement	
MSARVS301A	Develop and update caravan industry knowledge	
MSARVG201A	Tow a recreational vehicle safely	
MSARVT201A	Apply technical knowledge of recreational vehicle manufacturing to work activities	
SIRXSLS002A	Advise on products and services	
TAEDEL301A	Provide work skill instruction	
TLID2010A	Operate a forklift	
UEGNSG604B	Fill gas cylinders	
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate III.		

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MSA30610 Certificate III in Recreational Vehicle Manufacture

Modification History

Release 5 - Imported elective unit updated to current release.

Release 4 - AU imported elective units replaced by current versions. Prerequisites replaced by an asterisk. Equivalent.

Release 3 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package.

Release 2 - Imported unit code updated.

Description

This qualification covers the skills and knowledge required to perform the wide range of tasks performed in the manufacture of recreational vehicles.

Job roles/employment outcomes

The Certificate III in Recreational Vehicle Manufacture has been developed as a trade level qualification for use in MSA07 Manufacturing Training Package. This qualification has been developed in response to an industry request. People with this qualification would be expected to work under supervision manufacturing recreational vehicles, including:

- motor homes
- caravans
- camper trailers
- slide-ons
- fifth wheelers

to meet Australian requirements, such as road worthiness and the Australian Design Rule (ADR). They will analyse the manufacturing requirements and then carry them out.

They may work in a large manufacturing organisation or a smaller workshop.

Application

The sector typically manufactures recreational vehicles as required. This may include special/custom orders or standard manufacturer models. They may also specify and access outside specialist services, for example, for spray painting or licence requirements.

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Recreational vehicles may be made from a frame (timber, aluminium or steel) and skin (aluminium or fibre composite) or a manufactured wall panel or some other technology. They are typically mounted on a steel chassis. Fittings are typically timber/particle board but may be any other suitable material.

People with this qualification may be expected to:

- carry out the various stages in recreational vehicle manufacture
- undertake modifications/refits to a recreational vehicle
- prepare a recreational vehicle for sale.

This work will generally be undertaken in a factory or workshop environment.

Training programs for this qualification are suitable to be undertaken as part of a formal training contract with an employer under an Australian Traineeship or Apprenticeship arrangement.

Pathways into the qualification

This qualification may be accessed by direct entry.

The units of competency contained within this qualification are common with other qualifications and credit should be granted towards this qualification where competency has already been achieved.

Credit should also be granted towards this qualification where competency has been achieved in units of competency contained within relevant skill sets.

The units of competency in this qualification reflect competencies which are practiced within the industry and recognition of prior learning (RPL) should be granted where there is sufficient evidence of competency from work-based experience.

Pathways from the qualification

Further qualification pathways from this qualification include MSA40510 Certificate IV in Recreational Vehicles.

Additional qualification advice

MSA41108 Certificate IV in Competitive Manufacturing is available for team leaders or others who need a more generalist qualification covering the application of good manufacturing practice and lean principles.

Licensing considerations

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Units of competency in this qualification provide the underpinning knowledge and skills for various required licenses. Local regulations should be checked for details.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification**
Communication	• Maintaining communication about multiple subjects and with multiple audiences • Completing incident and other reports • Using technical and manufacturer information • Collecting, analysing and organising information • Communicating ideas and information • Using and contributing to workplace documentation • Maintaining workplace records
Teamwork	• Identifying and describing own role and role of others • Working within a team • Resolving conflicts between team members • Using teamwork strategies
Problem solving	• Recognising problems or potential problems • Determining problems needing priority action • Referring problems outside area of responsibility to appropriate person, with possible causes • Identifying appropriate theory base for problem • Seeking information and assistance as required to solve problems

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• Solving problems within area of responsibility • Following through items initiated until final resolution has occurred • Identifying and isolating faults in equipment • Using a range of formal problem-solving techniques
Initiative and enterprise	• Identifying the most appropriate process conditions for equipment • Determining problems needing action • Recommending required action • Reporting problems outside area of responsibility • Distinguishing between causes of faults
Planning and organising	• Prioritising actions to achieve required outcomes • Planning own work requirements and assisting others to plan theirs • Planning and organising activities • Identifying tasks to achieve team goals • Organising allocation of tasks • Monitoring completion of allocated tasks • Developing and adjusting a production schedule
Self-management	• Planning own work requirements from job requests • Operating within appropriate time constraints and work standards • Selecting and using appropriate equipment, materials, processes and procedures • Planning to ensure effective production • Applying standard procedures • Identifying documenting and monitoring resource requirements • Recognising limitations and seeking timely advice
Learning	• Asking questions to gain information • Identifying sources of information to expand knowledge and understanding • Participating in improvement procedures • Participating in development of continuous improvement strategies • Helping others develop competency
Technology	• Operating and adjusting equipment • Starting up and shutting down equipment • Setting up equipment • Monitoring quality • Understanding function and operating principles of equipment

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• Maintaining workplace records

Packaging Rules

Packaging Rules

To be awarded the Certificate III in Recreational Vehicle Manufacture competency must be achieved in **twenty two** (**22**) units of competency:

- **three** (**3**) core units of competency
- **nineteen** (**19**) elective units of competency, as specified below:
  - a minimum of **eight** (**8**) units of competency must be selected from Group A
  - the balance of units, to a maximum of **eleven** (**11**) may be selected from:
    - units not previously selected from Group A
    - Group B units listed below.

Note: Up to **four** (**4**) elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, as specified in Groups A and B.

Note: Where prerequisite units are identified, they must be counted in the total number of units required for completion of the qualification.

Core units of competency

Unit code	Unit title	Prerequisites
MSAENV272B	Participate in environmentally sustainable work practices	
MSAPMOHS200A	Work safely	
MSAPMSUP102A	Communicate in the workplace	

Elective units of competency

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Group A

Unit code	Unit title	Prerequisites
AUMGTT001	Apply trim to vehicle components	
AURETR2010	Fabricate, test and repair wiring harnesses and looms	
AURTTA3017	Carry out vehicle safety and roadworthy inspection	
AURVTN2005	Remove and fit protector mouldings, transfers and decals	
AURVTP2007	Apply paint touch-up techniques	
AURVTT3015	Fabricate canvas products	
AURVTT3016	Fabricate frame structures	
AURVTT3019	Fabricate and install canopies and curtains	
AURVTG3011	Install side windows	
MEM03001B	Perform manual production assembly	
MEM03003B	Perform sheet and plate assembly	*
MEM05005B	Carry out mechanical cutting	*
MEM05012C	Perform routine manual metal arc welding	
MEM05050B	Perform routine gas metal arc welding	
MEM05052A	Apply safe welding practices	
MEM07015B	Set computer controlled machines/processes	*
MEM07024B	Operate and monitor machine/process	
MEM07028B	Operate computer controlled machines/processes	*
MEM10002B	Terminate and connect electrical wiring	*
MEM11010B	Operate mobile load shifting equipment	
MEM12002B	Perform electrical/electronic measurement	

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Unit code	Unit title	Prerequisites
MEM12006C	Mark off/out (general engineering)	*
MEM12023A	Perform engineering measurements	
MEM18001C	Use hand tools	
MEM18002B	Use power tools/hand held operations	
MSAPMOPS101A	Make measurements	
MSARVS201A	Install LP gas systems in a recreational vehicle	
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate III.		

Group B

Unit code	Unit title	Prerequisites
MEM09002B	Interpret technical drawing	
MEM11011B	Undertake manual handling	
MEM14004A	Plan to undertake a routine task	
MEM15004B	Perform inspection	
MEM15024A	Apply quality procedures	
MSS402021A	Apply Just in Time procedures	
MSS402040A	Apply 5S procedures	
MSS402080A	Undertake root cause analysis	
MSAPMOHS220A	Provide initial first aid response	
MSAPMOPS212A	Use enterprise computers or data systems	
MSAPMSUP100A	Apply workplace procedures	

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Unit code	Unit title	Prerequisites
MSAPMSUP101A	Clean workplace or equipment	
MSAPMSUP106A	Work in a team	
MSAPMSUP280A	Manage conflict at work	
MSAPMSUP291A	Participate in continuous improvement	
MSARVS301A	Develop and update caravan industry knowledge	
MSARVG201A	Tow a recreational vehicle safely	
MSARVT201A	Apply technical knowledge of recreational vehicle manufacturing to work activities	
PMBPROD221B	Operate rotational moulding equipment	
PMBPROD321B	Produce rotational moulded products	*
SIRXSLS002A	Advise on products and services	
TAEDEL301A	Provide work skill instruction	
TLID2010A	Operate a forklift	
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate III.		

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MSA30710 Certificate III in Recreational Vehicle and Accessories Retailing

Modification History

Release 5 - Imported units updated to current releases.

Release 4 - Imported elective units replaced by current versions. Equivalent.

Release 3 - Minor formatting. Imported unit version code updated.

Release 2 - Imported unit code updated.

Description

This qualification covers the skills and knowledge designed to reflect the role of a sales consultant in the retail sales of recreational vehicles and accessories.

Job roles/employment outcomes

The Certificate III in Recreational Vehicle and Accessories Retailing has been developed as a trade level qualification for use in MSA07 Manufacturing Training Package. This qualification has been developed in response to an industry request. People with this qualification would be expected to work under supervision in the sale of recreational vehicles and accessories, including:

- motor homes
- caravans
- camper trailers
- slide-ons
- fifth wheelers

to meet Australian requirements, such as road worthiness and the Australian Design Rule (ADR). They will analyse the customer's requirements and then carry them out.

They may work in a service and repair facility or a manufacturer's factory undertaking sales work. Sales may be for a new recreational vehicle, a second-hand/refurbished recreational vehicle or spare parts and accessories. In some cases selling of the recreational vehicle may also include possible modifications which could be made to the recreational vehicle.

Application

The sector typically manufactures, services and repairs any recreational vehicle as required. Recreational vehicle sales requires specialised knowledge not only of the available range of recreational vehicle models and accessories but of the legal requirements associated with weight, towing and vehicle capacity.

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Recreational vehicles may be made from a frame (timber, aluminium or steel) and skin (aluminium or fibre composite) or a manufactured wall panel or some other technology. They are typically mounted on a steel chassis. Fittings are typically timber/particle board but may be any other suitable material.

People with this qualification may be expected to:

- sell a new or second-hand recreational vehicle
- suggest modifications/refits to a recreational vehicle
- prepare a recreational vehicle for sale/resale
- sell spare parts and accessories.

This work will generally be undertaken in a workshop or showroom environment.

Training programs for this qualification are suitable to be undertaken as part of a formal training contract with an employer under an Australian Traineeship or Apprenticeship arrangement.

Pathways into the qualification

This qualification may be accessed by direct entry.

The units of competency contained within this qualification are common with other qualifications and credit should be granted towards this qualification where competency has already been achieved.

Credit should also be granted towards this qualification where competency has been achieved in units of competency contained within relevant skill sets.

The units of competency in this qualification reflect competencies which are practiced within the industry and recognition of prior learning (RPL) should be granted where there is sufficient evidence of competency from work-based experience.

Pathways from the qualification

Further qualification pathways from this qualification include MSA40710 Certificate IV in Recreational Vehicle and Accessories Retailing.

Additional qualification advice

MSA41108 Certificate IV in Competitive Manufacturing is available for team leaders or others who need a more generalist qualification covering the application of good manufacturing practice and lean principles.

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Licensing considerations

Units of competency in this qualification provide the underpinning knowledge and skills for various required licenses. Local regulations should be checked for details.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification**
Communication	• Using questioning and active listening to ascertain and respond to customer needs to ensure customers enjoy a positive experience that reflects business values • Regularly carrying out verbal instructions from other team members and supervisors • Reading and interpreting simple workplace documents, completing simple written workplace forms and sharing work-related information with other team members
Teamwork	• Effectively participating in retail store teams • working independently to complete own tasks and supporting other team members where appropriate • Leading small retail teams, where required, in the context of the job role • Mentoring and supporting other team members
Problem solving	• Demonstrating sensitivity to customer needs and concerns • Anticipating problems and acting to avoid them where possible • Solving a range of operational retail store problems individually or in the context of a team structure where, after clarification, existing policies and infrastructure may be applied to source

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	information and resources and develop practical and sustainable solutions
Initiative and enterprise	• Looking for opportunities to do things better and suggesting ideas to other team members and supervisors in the context of the job role • Translating ideas into action by positively accepting and adapting to changes in procedures or arrangements at the store level
Planning and organising	• Establishing and communicating clear goals and deliverables for self and team members within the context of organisation objectives and the current store situation • Coordinating resources to ensure that work is carried out according to timelines and priorities • Coordinating and/or implementing changes arising from continuous improvement processes
Self-management	• Understanding how a personal job role fits into the context of the wider business values and directions • Working within the store culture by practising inclusive behaviour, effective management of personal presentation, hygiene and time • Efficiently prioritising and completing delegated tasks • Maintaining own knowledge of the job role, reviewing own performance and actively seeking and acting upon advice and guidance
Learning	• Identifying personal strengths and weaknesses in the context of the job role and recognising how to personally learn best at work • Seeking opportunities for formal education in the context of a current role or future retail job opportunities • Accepting opportunities to learn new ways of doing things and sharing knowledge and skills with other store team members
Technology	• Using of point-of-sale systems and/or selecting and using a range of other retail technology in the context of available equipment and store procedures • Recognising and reporting faulty equipment and following store occupational health and safety (OHS) procedures

Packaging Rules

Packaging Rules

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To be awarded the Certificate III in Recreational Vehicle and Accessories Retailing competency must be achieved in **twenty two** (**22**) units of competency:

- **three** (**3**) core units of competency
- **nineteen** (**19**) elective units of competency, as specified below:

  - a minimum of **thirteen** (**13**) units of competency must be selected from Group A
  - the balance of units, to a maximum of **six** (**6**) may be selected from:
    - units not previously selected from Group A
    - Group B units listed below.

Note: Up to **four** (**4**) elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, as specified in Groups A and B.

Note: Where prerequisite units are identified, they must be counted in the total number of units required for completion of the qualification.

Core units of competency

Unit code	Unit title	Prerequisites
MSAENV272B	Participate in environmentally sustainable work practices	
MSAPMOHS200A	Work safely	
MSAPMSUP102A	Communicate in the workplace	

Elective units of competency

Group A

Unit code	Unit title	Prerequisites
AUMANA001	Prepare and document quotations	

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Unit code	Unit title	Prerequisites
AURACA2001	Establish relations with customers	
AURC341903A	Apply relevant finance, leasing and insurance contracts/policies	
AURACA3002	Establish customer requirements of a complex nature	
AURACA3003	Build customer relations	
AURAMA3004	Maintain business image	
AURAMA4005	Manage complex customer issues	
AURSCA2002	Present stock and sales area	
AURSCA2003	Apply sales procedures	
AURSCA2004	Carry out cash, credit and funds transfers	
AURSCA2005	Sell products	
AURSCA2006	Promote products and services	
AURSAA2001	Process customer complaints	
BSBCUS501C	Manage quality customer service	
SIRXCCS201	Apply point-of-sale handling procedures	
SIRXINV004A	Buy merchandise	
SIRXRSK001A	Minimise theft	
SIRXRSK002A	Maintain store security	
SIRXSLS002A	Advise on products and services	
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate III.		

Group B

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Unit code	Unit title	Prerequisites
AURSCA2001	Select automotive parts and products	
AURSLA2001	Apply legal requirements relating to product sales	
AURSBA3002	Apply automotive parts interpretation process	
AURTTA3017	Carry out vehicle safety and roadworthy inspection	
MSAPMOHS220A	Provide initial first aid response	
MSAPMOPS212A	Use enterprise computers or data systems	
MSAPMSUP100A	Apply workplace procedures	
MSAPMSUP106A	Work in a team	
MSAPMSUP280A	Manage conflict at work	
MSAPMSUP291A	Participate in continuous improvement	
MSARVS301A	Develop and update caravan industry knowledge	
MSARVG201A	Tow a recreational vehicle safely	
SITXMPR401	Coordinate production of brochures and marketing materials	
SITXMPR402	Create a promotional display or stand	
UEGNSG604B	Fill gas cylinders	
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate III.		

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MSA40108 Certificate IV in Manufacturing Technology

Modification History

Version 4 - Imported elective units replaced by current versions. Equivalent.

Version 3 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package.

Description

This qualification is suitable for delivery as part of a two year Technology Cadetship, or can be undertaken through an Australian Apprenticeship arrangement.

This qualification has five specialist streams available. These are:

- CAD/Drafting
- Manufacturing Operations
- Laboratory Operations
- Technical Officer
- Polymer Technology.

Each stream offers an opportunity for significant choice in electives and each stream requires the same core units to be completed.

Note:

- The minimum requirements for the Certificate III in Manufacturing Technology can also be met by holders of the *Certificate III in Engineering - Technician* from the Metal and Engineering Training Package.
-

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

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Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

Certificate IV in Manufacturing Technology

The following table contains a summary of the Employability Skills as identified by the manufacturing technology related industries for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that reflect skill requirements for this level.

Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Complete workplace documentation and records • Use communication technologies efficiently • Develop work instructions, specifications and procedures • Demonstrate effective and appropriate communication and interpersonal skills when dealing with people from NESB • Communicate with all team members • Demonstrate effective and appropriate communication and interpersonal skills when dealing with clients • Use most appropriate communication method given priority, cost and customer facilities • Access, interpret and apply technical information
Teamwork	• Work cooperatively with people of different ages, gender, race or religion • Liaise with and provide support to other team members • Work as part of a team • Identify and manage performance required to rneet internal and external customer needs in own work and team • Manage technical processes and provide problem solving support to others
Problem solving	• Investigate problem causes • Identify, rectify or report potential difficulties associated with manufacture of products or provision of services • Identify environmental features, regulations, insurance requirements, legal requirements and other factors which may affect the product or service to be provided

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Employability Skill	**Industry/enterprise requirements for this qualification include**:
	• Use material and process knowledge to solve problems • Identify hazards and suggest control measures • Determine production requirements • Conduct tests and analyse results to determine and assess production requirements
Initiative and enterprise	• Seek feedback on products, processes and procedures • Gather and analyse information and apply to work related processes • Record information on the quality and other indicators of products • Support achievement of efficient production processes • Determine and act on situations requiring further information or problem solving
Planning and organizing	• Identify hazards and implement appropriate hazard control measures • Demonstrate time management skills • Source and prepare materials and resources • Sequence work to maximise safety and productivity
Self management	• Interpret and apply relevant acts and regulations • Keep the work area clean and tidy at all times • Monitor own work and work of team and identify and act on any quality issues • Understand own work activities • Manage own time to meet deadlines • Implement workplace procedures and instructions
Learning	• Implement learning activities as appropriate to ensure achievement of specified production requirements • Assess competencies in meeting job requirements • Be supportive, assertive and use interpersonal skills • Identify own training needs and seek skill development if required • Gather feedback to own work to assess effectiveness in meeting objectives and integrate information into own practice
Technology	• Use computer software applications effectively • Work with technology safely and according to workplace standards • Help others use technology efficiently and safely • Use testing technology

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Packaging Rules

Packaging Rules

To be awarded a Certificate IV in Manufacturing Technology, competency must be achieved in **sixteen** (**16**) units of competency:

- **four** (**4**) core units of competency
- **twelve** (**12**) elective units of competency, chosen as described below.

Core units

The following **four** (**4**) units must be chosen.

Unit code	Unit title
MEM16008A	Interact with computing technology
MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment
MSS402051A	Apply quality standards
MSAENV272B	Participate in environmentally sustainable work practices

Prerequisites

Units marked with an asterisk have one or more prerequisite requirements. The prerequisites for these units are to be counted in the total number of units required in the elective group. Please refer to the individual units for details.

Elective units

Group A - specialist streams

Choose **twelve** (**12**) elective units as specified to achieve a specialist stream.

Note:

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- All units from each specialist stream are available in Group B as General Electives.
- Three elective units may also be chosen from other qualifications in this Training Package, other endorsed Training Packages and accredited courses, as specified below.

CAD/drafting specialist stream

Select **twelve** (**12**) elective units:

- a minimum of **ten** (**10**) from the list below
- the balance may be chosen from Group B General Electives.

Unit code	Unit title	Prerequisites
AUM4003A	Interpret customer requirements	
LMTGN4002A	Participate in product engineering	
MEM12024A	Perform computations	
MEM16006A	Organise and communicate information	
MEM30031A	Operate computer-aided design (CAD) system to produce basic drawing elements	
MEM30032A	Produce basic engineering drawings	
MEM30033A	Use computer-aided design (CAD) to create and display 3-D models	*
MEM30005A	Calculate force systems within simple beam structures	*
MEM30006A	Calculate stresses in simple structures	*
MEM30007A	Select common engineering materials	
MEM30008A	Apply basic economic and ergonomic concepts to evaluate engineering applications	
MEM30010A	Set up basic hydraulic circuits	
MEM30011A	Set up basic pneumatic circuits	
MEM30013A	Assist in the preparation of a basic workplace layout	
MEM30018A	Undertake basic process planning	

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Unit code	Unit title	Prerequisites
MEM30019A	Use resource planning software systems in manufacturing	*
MEM30020A	Develop and manage a plan for a simple manufacturing related project	
MEM30025A	Analyse a simple electrical system circuit	*
MSS402002A	Sustain process improvements	
MSS402030A	Apply cost factors to work practices	
UEPMNT420A	Perform electrical/electronic drafting	
	One (1) relevant specialist elective unit may be chosen from other qualifications in this Training Package, other endorsed Training Packages and accredited courses.	

Manufacturing operations specialist stream

Select **twelve** (**12**) elective units:

- a minimum of **ten** (**10**) from the list below
- the balance may be chosen from Group B General Electives.

Unit code	Unit title	Prerequisites
FDFOP2005A	Work in a socially diverse environment	
MEM15001B	Perform basic statistical quality control	
MEM16006A	Organise and communicate information	
MEM30014A	Apply basic just in time systems to the reduction of waste	
MEM30015A	Develop recommendations for basic set up time improvements	
MEM30016A	Assist in the analysis of a supply chain	

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Unit code	Unit title	Prerequisites
MEM30017A	Use basic preventative maintenance techniques and tools	
MEM30018A	Undertake basic process planning	
MEM30019A	Use resource planning software systems in manufacturing	*
MEM30020A	Develop and manage a plan for a simple manufacturing related project	
MEM30021A	Prepare a simple production schedule	
MEM30023A	Prepare a simple cost estimate for a manufactured product	
MEM30024A	Participate in quality assurance techniques	*
MSS402001A	Apply competitive systems and practices	
MSS402002A	Sustain process improvements	
MSS402020A	Apply quick changeover procedures	
MSS402030A	Apply cost factors to work practices	
MSS402031A	Interpret product costs in terms of customer requirements	
MSS402050A	Monitor process capability	
MSS402060A	Use planning software systems in operations	
MSS402061A	Use SCADA systems in operations	
MSS402080A	Undertake root cause analysis	
MSS403002A	Ensure process improvements are sustained	
MSS403030A	Improve cost factors in work practices	
MSAENV472B	Implement and monitor environmentally sustainable work practices	
	One relevant specialist elective unit may be chosen from other qualifications in this Training Package,	

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Unit code	Unit title	Prerequisites
	other endorsed Training Packages and accredited courses.	

Laboratory operations specialist stream

Select **twelve** (**12**) elective units:

- a minimum of **ten** (**10**) from the list below
- the balance may be chosen from Group B General Electives.

Unit code	Unit title	Prerequisites
LMTGN4016A	Contribute to the development of products or processes	
MEM30012A	Apply mathematical techniques in a manufacturing engineering or related environment	
MEM30019A	Use resource planning software systems in manufacturing	*
MEM30024A	Participate in quality assurance techniques	*
MSS402061A	Use SCADA systems in operations	
MSL913001A	Communicate with other people	
MSL913002A	Plan and conduct laboratory/field work	
MSL922001A	Record and present data	
MSL933001A	Maintain the laboratory/field workplace fit for purpose	
MSL933002A	Contribute to the achievement of quality objectives	
MSL933003A	Apply critical control point requirements	
MSL934001A	Contribute to the ongoing development of HACCP plans	
MSL934002A	Apply quality system and continuous improvement	

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Unit code	Unit title	Prerequisites
	processes	
MSL943001A	Work safely with instruments that emit ionising radiation	
MSL943002A	Participate in laboratory/field workplace safety	
MSL952001A	Collect routine site samples	
MSL952002A	Handle and transport samples or equipment	
MSL953001A	Receive and prepare samples for testing	
MSL954001A	Obtain representative samples in accordance with sampling plan	
MSL963001A	Operate basic handblowing equipment	
MSL963002A	Repair glass apparatus using simple glassblowing equipment	
MSL973001A	Perform basic tests	
MSL973002A	Prepare working solutions	
MSL973003A	Prepare culture media	
MSL973004A	Perform aseptic techniques	
MSL973005A	Assist with fieldwork	
MSL973006A	Prepare trial batches for evaluation	
MSL973007A	Perform microscopic examination	
MSL973012A	Assist with geotechnical site investigations	
MSL974001A	Prepare, standardise and use solutions	
MSL974002A	Conduct geotechnical site investigations	*
MSL974003A	Perform chemical tests and procedures	
	One relevant specialist elective unit may be chosen from other qualifications in this Training Package, other endorsed Training Packages and accredited	

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Unit code	Unit title	Prerequisites
	courses.	

Technical officer specialist stream

Select **twelve** (**12**) elective units:

- a minimum of **ten** (**10**) from the list below
- the balance may be chosen from Group B General Electives.

Unit code	Unit title	Prerequisites
LMTGN4016A	Contribute to the development of products or processes	
MEM15001B	Perform basic statistical quality control	
MEM16006A	Organise and communicate information	
MEM30031A	Operate computer-aided design (CAD) system to produce basic drawing elements	
MEM30032A	Produce basic engineering drawings	
MEM30007A	Select common engineering materials	
MEM30008A	Apply basic economic and ergonomic concepts to engineering designs and applications	
MEM30009A	Contribute to the design of basic mechanical systems	*
MEM30010A	Set up basic hydraulic circuits	
MEM30011A	Set up basic pneumatic circuits	
MEM30013A	Assist in the design of basic workplace layout	
MEM30016A	Assist in the analysis of a supply chain	
MEM30017A	Use basic preventative maintenance techniques and tools	
MEM30018A	Undertake basic process planning	

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Unit code	Unit title	Prerequisites
MEM30019A	Use resource planning software systems in manufacturing	*
MEM30020A	Develop and manage a plan for a simple manufacturing related project	
MEM30022A	Undertake supervised procurement activities	
MEM30023A	Prepare a simple cost estimate for a manufactured product	
MEM30024A	Participate in quality assurance techniques	*
MSS402031A	Interpret product costs in terms of customer requirements	
MSS402060A	Use planning software systems in operations	
MSS402061A	Use SCADA systems in operations	
MSS402080A	Undertake root cause analysis	
MSS403032A	Analyse manual handling processes	
	One relevant specialist elective unit may be chosen from other qualifications in this Training Package, other endorsed Training Packages and accredited courses.	

Polymer technology specialist stream

Select **twelve** (**12**) elective units:

- a minimum of **six** (**6**) from the list below
- the balance may be chosen from Group General Electives.

Unit code	Unit title	Prerequisites
LMTGN4016A	Contribute to the development of products or processes	

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Unit code	Unit title	Prerequisites
MEM15001B	Perform basic statistical quality control	
MEM16006A	Organise and communicate information	
MEM30031A	Operate computer-aided design (CAD) system to produce basic drawing elements	
MEM30032A	Produce basic engineering drawings	
MEM30007A	Select common engineering materials	
MEM30008A	Apply basic economic and ergonomic concepts to engineering designs and applications	
MEM30020A	Develop and manage a plan for a simple manufacturing related project	
	Up to two (2) relevant units may be chosen from the **production** units available at Certificate III or IV in the Plastics, Rubber & Cablemaking Training Package (PMB07), or its endorsed replacement. Note that any prerequisites are to be counted in the total number of units.	
	One (1) relevant specialist elective units may be chosen from other qualifications in this Training Package, other endorsed Training Packages and accredited courses.	

Note that for the polymer technology specialist stream, **only one of the following general elective units may be chosen**, **not both**.

Unit code	Unit title	Prerequisites
PMBPREP301C	Set up and prepare for production	
PMBPREP303C	Set up equipment for continuous production	

Group B - General electives

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The balance of units for each specialist stream may be chosen from this list as specified below:

CAD/drafting:	Up to two units
Manufacturing operations:	Up to two units
Laboratory operations:	Up to two units
Technical officer:	Up to two units
Polymer technology:	Up to six units

Unit code	**Unit title**	**Prerequisites**
AUM4003A	Interpret customer requirements	
FDFOP2005A	Work in a socially diverse environment	
LMTGN4002A	Participate in product engineering	
LMTGN4016A	Contribute to the development of products or processes	
MEM12024A	Perform computations	
MEM15001B	Perform basic statistical quality control	
MEM16006A	Organise and communicate information	
MEM30031A	Operate computer-aided design (CAD) system to produce basic drawing elements	
MEM30032A	Produce basic engineering drawings	
MEM30033A	Use computer-aided design (CAD) to create and display 3-D models	*
MEM30005A	Calculate force systems within simple beam structures	*
MEM30006A	Calculate stresses in simple structures	*
MEM30007A	Select common engineering materials	

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Unit code	Unit title	Prerequisites
MEM30008A	Apply basic economic and ergonomic concepts to engineering designs and applications	
MEM30009A	Contribute to the design of basic mechanical systems	*
MEM30010A	Set up basic hydraulic circuits	
MEM30011A	Set up basic pneumatic circuits	
MEM30012A	Apply mathematical techniques in a manufacturing engineering or related environment	
MEM30013A	Assist in the preparation of a basic workplace layout	
MEM30014A	Apply basic just in time systems to the reduction of waste	
MEM30015A	Develop recommendations for basic set up time improvements	
MEM30016A	Assist in the analysis of a supply chain	
MEM30017A	Use basic preventative maintenance techniques and tools	
MEM30018A	Undertake basic process planning	
MEM30019A	Use resource planning software systems in manufacturing	*
MEM30020A	Develop and manage a plan for a simple manufacturing related project	
MEM30021A	Prepare a simple production schedule	
MEM30022A	Undertake supervised procurement activities	
MEM30023A	Prepare a simple cost estimate for a manufactured product	
MEM30024A	Participate in quality assurance techniques	*
MEM30025A	Analyse a simple electrical system circuit	*
MSS402001A	Apply competitive systems and practices	

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Unit code	Unit title	Prerequisites
MSS402002A	Sustain process improvements	
MSS402020A	Apply quick changeover procedures	
MSS402030A	Apply cost factors to work practices	
MSS402031A	Interpret product costs in terms of customer requirements	
MSS402050A	Monitor process capability	
MSS402060A	Use planning software systems in operations	
MSS402061A	Use SCADA systems in operations	
MSS402080A	Undertake root cause analysis	
MSS403002A	Ensure process improvements are sustained	
MSS403030A	Improve cost factors in work practices	
MSS403032A	Analyse manual handling processes	
MSAENV472B	Implement and monitor environmentally sustainable work practices	
MSL913001A	Communicate with other people	
MSL913002A	Plan and conduct laboratory/field work	
MSL922001A	Record and present data	
MSL933001A	Maintain the laboratory/field workplace fit for purpose	
MSL933002A	Contribute to the achievement of quality objectives	
MSL933003A	Apply critical control point requirements	
MSL934001A	Contribute to the ongoing development of HACCP plans	
MSL934002A	Apply quality system and continuous improvement processes	
MSL943001A	Work safely with instruments that emit ionising	

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Unit code	Unit title	Prerequisites
	radiation	
MSL943002A	Participate in laboratory/field workplace safety	
MSL952001A	Collect routine site samples	
MSL952002A	Handle and transport samples or equipment	
MSL953001A	Receive and prepare samples for testing	
MSL954001A	Obtain representative samples in accordance with sampling plan	
MSL963001A	Operate basic handblowing equipment	
MSL963002A	Repair glass apparatus using simple glassblowing equipment	
MSL973001A	Perform basic tests	
MSL973002A	Prepare working solutions	
MSL973003A	Prepare culture media	
MSL973004A	Perform aseptic techniques	
MSL973005A	Assist with fieldwork	
MSL973006A	Prepare trial batches for evaluation	
MSL973007A	Perform microscopic examination	
MSL973012A	Assist with geotechnical site investigations	
MSL974001A	Prepare, standardise and use solutions	
MSL974002A	Conduct geotechnical site investigations	*
MSL974003A	Perform chemical tests and procedures	
UEPMNT420A	Perform electrical/electronic drafting	
	A maximum of **two** (2) general electives may be imported from other qualifications in this Training Package, other endorsed Training Packages and accredited courses where those units are available at	

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Unit code	Unit title	Prerequisites
	Certificate III.	

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MSA40311 Certificate IV in Process Manufacturing

Modification History

Release 4 - Imported elective units updated to current releases.

Release 3 - Imported elective units updated to current versions. Equivalent.

Release 2 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package. Imported unit version code updated.

Release 1 - New qualification

Description

This qualification covers the skills and knowledge required to perform a range of high level technical operations and manufacturing tasks required for producing products.

Job roles/employment outcomes

The MSA40311 Certificate IV in Process Manufacturing is intended for advanced production workers who use a range of equipment and are involved in solving complex problems which require theoretical knowledge, combined with an understanding of operating procedures directly related to producing products.

Application

This qualification is typically used to develop employees performing a technical role that includes the ability to work independently and conduct technical problem solving according to the needs of the work required to produce products.

This qualification is designed to develop employees who operate across more than one category within process manufacturing or other product conversion processes in manufacturing. Typical applications would be in chemical, hydrocarbons, refining, minerals processing, plastics, rubber, cablemaking, manufactured mineral products, and other areas as appropriate.

Non-technical team leaders, coordinators and supervisors may be better served by a qualification in competitive manufacturing.

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Pathways Information

Pathways into the qualification

This qualification may be accessed by direct entry.

The units of competency contained within this qualification are common with other qualifications. In particular, the core units and most of the elective units are common to qualifications in the three Process Manufacturing Training Packages (coded PMA, PMB and PMC). Where competency has already been achieved, credit will be granted towards this qualification.

The units of competency in this qualification reflect competencies which are practised within the industry and recognition of prior learning (RPL) should be granted where there is sufficient evidence of competency from work-based experience.

Pathways from the qualification

Further qualification pathways from this qualification include MSA50311 Diploma of Production Management.

The MSA51108 Diploma of Competitive Manufacturing (or latest version) is also appropriate for those needing a qualification covering manufacturing practice and lean principles.

Licensing/Regulatory Information

There are no specific licences that relate to this qualification. However, in some jurisdictions some units of competency in this qualification may have regulatory requirements. Local regulations should be checked for details.

Entry Requirements

Not applicable.

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Employability Skills Summary

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	• Complete workplace documentation and records • Use communication technologies efficiently • Develop work instructions, specifications and procedures • Communicate with all team members • Demonstrate effective and appropriate communication and interpersonal skills when dealing with clients • Use most appropriate communication method given priority, cost and customer facilities • Access, interpret and apply technical information
Teamwork	• Work cooperatively with people of different ages, gender, race or religion • Liaise with, and provide support to, other team members • Work as part of a team • Identify and manage performance required to meet internal and external customer needs in own work and team • Manage technical processes and provide problem solving support to others
Problem-solving	• Investigate problem causes • Identify, rectify or report potential difficulties associated with manufacture of products or provision of services • Identify environmental features, regulations, insurance requirements, legal requirements and other factors which may affect the product or service to be provided • Use material and process knowledge to solve problems • Identify hazards and suggest control measures • Determine production requirements • Conduct tests and analyse results to determine and assess production requirements
Initiative and enterprise	• Seek feedback on products, processes and procedures • Gather and analyse information and apply to work-related processes • Record information on the quality and other indicators of products • Support achievement of efficient production processes • Determine and act on situations requiring further information or problem solving
Planning and organising	• Identify hazards and implement appropriate hazard control

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	measures • Demonstrate time management skills • Source and prepare materials and resources • Sequence work to maximise safety and productivity
Self-management	• Interpret and apply relevant Acts and regulations • Keep the work area clean and tidy at all times • Monitor own work and work of team and identify and act on any quality issues • Understand own work activities • Manage own time to meet deadlines • Implement workplace procedures and instructions
Learning	• Implement learning activities, as appropriate, to ensure achievement of specified production requirements • Assess competencies in meeting job requirements • Be supportive, assertive and use interpersonal skills • Identify own training needs and seek skill development if required • Gather feedback on own work to assess effectiveness in meeting objectives and integrate information into own practice
Technology	• Use computer software applications effectively • Work with technology safely and according to workplace standards • Help others use technology efficiently and safely • Use testing technology

Packaging Rules

To be awarded the MSA40311 Certificate IV in Process Manufacturing competency must be achieved in a total of **twenty six (26)** units of competency.

- **five (5)** core units of competency
- **twenty one (21)** elective units of competency, as specified below.

Elective units must include:

- a minimum of **four (4)** units from Group A
- the balance of units, to a maximum of **seventeen (17)** may be chosen from Groups A, B and C (with a maximum of eleven (11) units from Group C).

Up to **seven (7)** elective units may be chosen from other qualifications in this Training Package, other endorsed Training Packages and accredited courses, as specified below in

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Groups B and C.

Note: Units marked with an asterisk have one or more prerequisite requirements. Please refer to the individual units for details. Prerequisites are to be counted towards the total number required to complete the qualification.

Core units of competency

Unit code	Unit title
MSS402051A	Apply quality standards
MSAENV272B	Participate in environmentally sustainable work practices
MSAPMOHS200A	Work safely
MSAPMSUP200A	Achieve work outcomes
MSAPMSUP210A	Process and record information

Elective units of competency

Group A

Unit code	Unit title	Prerequisites
MSS403002A	Ensure process improvements are sustained	
MSS403010A	Facilitate change in an organisation implementing competitive systems and practices	
MSS403011A	Facilitate implementation of competitive systems and practices	
MSS403013A	Lead team culture improvement	
MSS403021A	Facilitate a Just in Time system	

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MSS403030A	Improve cost factors in work practices	
MSS403040A	Facilitate and improve implementation of 5S	
MSS403041A	Facilitate breakthrough improvements	
MSS403051A	Mistake proof an operational process	
MSS404050A	Undertake process capability improvements	*
MSS404052A	Apply statistics to operational processes	
MSS404060A	Facilitate the use of planning software systems in a work area or team	
MSS404081A	Undertake proactive maintenance analyses	
MSS404082A	Assist in implementing a proactive maintenance strategy	
MSAENV472B	Implement and monitor environmentally sustainable work practices	
MSAPMOHS400A	Contribute to OHS management system	*
MSAPMOHS401A	Assess risk	
MSAPMOPS400A	Optimise process/plant area	*
MSAPMOPS401A	Trial new process or product	
MSAPMOPS404A	Co-ordinate maintenance	
MSAPMOPS405B	Identify problems in fluid power system	
MSAPMOPS406A	Identify problems in electronic control systems	
MSAPMPER400A	Coordinate permit process	*
MSAPMSUP400A	Develop and monitor quality systems	
MEM15001B	Perform basic statistical quality control	
MSL954001A	Obtain representative samples in accordance with a sampling plan	
MSL974003A	Perform chemical tests and procedures	
PMAOHS420B	Develop First Aid procedures and manage resources	

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PMAOMIR407B	Audit incident preparedness and established response system	
PMAOMIR418B	Coordinate incident response	
PMAOMIR424B	Develop and maintain community relationships	
PMAOMIR430B	Conduct and assess incident exercises	
PMAOMIR444B	Develop incident containment tactics	
PMAOMIR449B	Monitor legal compliance obligations during incidents	
PMAOPS402A	Respond to abnormal process situations	*
PMAOPS405A	Operate complex control systems	
PMAOPS410B	Monitor remote production facilities	
PMAOPS411B	Manage plant shutdown and restart	
PMAOPS450B	Solve colour problems	
PMASUP410B	Develop plant documentation	
PMASUP420B	Minimise environmental impact of process	
PMASUP432B	Coordinate pipeline projects	
PMASUP440B	Commission/recommission plant	
PMASUP441C	Decommission plant	
PMASUP445A	Participate in HAZOP studies	*
PMBPROD430B	Trial a new die/tool	
PMBPROD431B	Trial a new, advanced or complex mould	
PMBTECH401B	Predict polymer properties and characteristics	*
PMBTECH402B	Set advanced or complex dies	*
PMBTECH403B	Test fibre-composites materials and laminates	
PMBTECH404B	Mould chemical resistant and/or fire retardant fibre-composites	*
PMBTECH405B	Repair damaged fibre-composites structures	*

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PMBTECH406A	Diagnose production equipment problems	
PMC554020D	Design and prepare models, moulds and dies	
PMC554090B	Undertake simple refractory design	
PMC554091B	Analyse refractory failures	
PSPPM402B	Manage simple projects	

Group B

Unit code	**Unit title**	**Prerequisites**
MSAPMOHS300A	Facilitate the implementation of OHS for a work group	*
MSAPMOPS363A	Organise on site work	
MSAPMPER300C	Issue work permits	*
MSAPMSUP300A	Identify and implement opportunities to maximise production efficiencies	*****
MSAPMSUP301A	Apply HACCP to the workplace	
MSAPMSUP303A	Identify equipment faults	
MSAPMSUP309A	Maintain and organise workplace records	
MSAPMSUP310A	Contribute to the development of plant documentation	
MSAPMSUP330A	Develop and adjust a production schedule	
MSAPMSUP382A	Provide coaching/mentoring in the workplace	
MSAPMSUP383A	Facilitate a team	
MSAPMSUP390A	Use structured problem solving tools	
MEM03001B	Perform manual production assembly	
MEM03006B	Set assembly stations	*****
MEM09002B	Interpret technical drawing	

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MEM09204A	Produce basic engineering detail drawings	*****
MEM11005B	Pick and process order	
MEM11006B	Perform production packaging	
MEM11007B	Administer inventory procedures	
MEM12023A	Perform engineering measurements	
MEM15003B	Use improvement processes in team activities	*
MEM15004B	Perform inspection	
MSL973001A	Perform basic tests	
PMBPREP304C	Set a die	
PMBPROD347B	Produce composites using hand lamination	
PMBPROD380B	Produce composites using chopper gun/depositor	
PMBTECH301B	Use material and process knowledge to solve problems	
TAEASS401B	Plan assessment activities and processes	
TAEASS402B	Assess competence	
TAEASS403B	Participate in assessment validation	
TAEDEL301A	Provide work skill instruction	

A maximum of four (4) units may be selected from this Training Package, other endorsed Training Packages and accredited courses, where those units are aligned at Certificate III or IV.

Group C

Unit code	**Unit title**	**Prerequisites**
MSS402002A	Sustain process improvements	
MSS402020A	Apply quick changeover procedures	

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MSS402021A	Apply Just in Time procedures	
MSS402030A	Apply cost factors to work practices	
MSS402040A	Apply 5S procedures	
MSS402050A	Monitor process capability	
MSS402060A	Use planning software systems in operations	
MSS402080A	Undertake root cause analysis	
MSAPMOHS100A	Follow OHS procedures	
MSAPMOHS110A	Follow emergency response procedures	
MSAPMOHS205A	Control minor incidents	
MSAPMOHS210B	Undertake first response to non-fire incidents	
MSAPMOHS212A	Undertake first response to fire incidents	
MSAPMOHS216A	Operate breathing apparatus	
MSAPMOHS217A	Gas test atmospheres	
MSAPMOHS220A	Provide initial first aid response	
MSAPMOPS100A	Use equipment	
MSAPMOPS101A	Make measurements	
MSAPMOPS102A	Perform tasks to support production	
MSAPMOPS200A	Operate equipment	
MSAPMOPS212A	Use enterprise computers or data systems	
MSAPMPER200C	Work in accordance with an issued permit	
MSAPMPER201A	Monitor and control work permits	
MSAPMPER202A	Observe permit work	*
MSAPMPER205C	Enter confined space	*
MSAPMSUP100A	Apply workplace procedures	
MSAPMSUP101A	Clean workplace or equipment	

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MSAPMSUP102A	Communicate in the workplace	
MSAPMSUP106A	Work in a team	
MSAPMSUP172A	Identify and minimise environmental hazards	
MSAPMSUP201A	Receive or despatch goods	
MSAPMSUP204A	Pack products or materials	
MSAPMSUP205A	Transfer loads	
MSAPMSUP230A	Monitor process operations	
MSAPMSUP240A	Undertake minor maintenance	
MSAPMSUP273A	Handle goods	
MSAPMSUP280A	Manage conflict at work	
MSAPMSUP291A	Participate in continuous improvement	
MSAPMSUP292A	Sample and test materials and product	
FPICOT2238A	Cut materials with a hand-held chainsaw	
LMTGN2008B	Coordinate work of team/section	
MEM03003B	Perform sheet and plate assembly	
MEM03004B	Perform electronic/electrical assembly (production)	
MEM13003B	Work safely with industrial chemicals and materials	
MEM16006A	Organise and communicate information	
MEM16007A	Work with others in a manufacturing, engineering or related environment	
MEM16008A	Interact with computing technology	
MEM18001C	Use hand tools	
MEM18002B	Use power tools/hand held operations	
PMAOPS280B	Interpret process plant schematics	
PMBHAN103C	Shift materials safely by hand	

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PMBPROD247C	Hand lay up composites	
RIIRIS201B	Conduct local risk control	
TLID2010A	Operate a forklift	

A maximum of **three (3)** units may be selected from this Training Package, other endorsed Training Packages and accredited courses, where those units are aligned at Certificate II or III.

Custom Content Section

Not applicable.

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MSA40510 Certificate IV in Recreational Vehicles

Modification History

Release 5 - Imported elective unit updated to current release.

Release 4 - Imported elective units replaced by current versions. Prerequisites replaced by an asterisk. Equivalent.

Release 3 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package. Imported unit version code updated.

Release 2 - Imported unit code updated.

Description

This qualification covers the skills and knowledge required to facilitate the performance of, and to perform, high level manufacturing, service and repair tasks required for recreational vehicles.

Job roles/employment outcomes

The Certificate IV in Recreational Vehicles has been developed as a post-trade level qualification for use in MSA07 Manufacturing Training Package. This qualification has been developed in response to an industry request. People with this qualification would be expected to lead work teams and provide supervision of people undertaking the manufacture, service and repair of recreational vehicles, including:

- motor homes
- caravans
- camper trailers
- slide-ons
- fifth wheelers

to meet Australian requirements, such as road worthiness and the Australian Design Rule (ADR). They will provide technical leadership as well as undertake some tasks themselves.

They may work in a service and repair facility or a manufacturer's factory. Work may include building a new recreational vehicle, repairs for an insurance claim or other repairs, modifying an existing recreational vehicle or undertaking routine servicing.

Application

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The sector typically manufactures, services and repairs recreational vehicles as required. This may apply to the recreational vehicle body, fittings and running gear. Repairs may be in response to a road (or other) accident, hail damage, vehicle modification or routine servicing. They may also specify and access outside specialist services, for example, for spray painting or licence requirements.

Recreational vehicles may be made from a frame (timber, aluminium or steel) and skin (aluminium or fibre composite) or a manufactured wall panel or some other technology. They are typically mounted on a steel chassis which may be manufactured by the recreational vehicle manufacturer or bought. Fittings are typically timber/particle board but may be any other suitable material.

People with this qualification may be expected to lead and also undertake one or more of:

- manufacture of a recreational vehicle
- insurance repairs
- other repairs
- work under warranty
- modifications/refits to the recreational vehicle
- routine servicing
- preparation of a recreational vehicle for sale/resale.

This work will generally be undertaken in a workshop environment or factory.

Training programs for this qualification are suitable to be undertaken as part of a formal training contract with an employer under an Australian Traineeship or Apprenticeship arrangement.

Pathways into the qualification

This qualification may be accessed by direct entry.

The units of competency contained within this qualification are common with other qualifications and credit should be granted towards this qualification where competency has already been achieved.

Credit should also be granted towards this qualification where competency has been achieved in units of competency contained within relevant skill sets.

The units of competency in this qualification reflect competencies which are practiced within the industry and recognition of prior learning (RPL) should be granted where there is sufficient evidence of competency from work-based experience.

Pathways from the qualification

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Further qualification pathways from this qualification include MSA50510 Diploma of Recreational Vehicles.

Additional qualification advice

MSA41108 Certificate IV in Competitive Manufacturing is available for team leaders or others who need a more generalist qualification covering the application of good manufacturing practice and lean principles.

Licensing considerations

Units of competency in this qualification provide the underpinning knowledge and skills for various required licenses. Local regulations should be checked for details.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification**
Communication	• Completing workplace documentation and records • Using communication technologies efficiently • Developing work instructions, specifications and procedures • Communicating with all team members • Demonstrating effective and appropriate communication and interpersonal skills when dealing with clients • Using most appropriate communication method given priority, cost and customer facilities • Accessing, interpreting and applying technical information

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Teamwork	• Working cooperatively with people of different ages, gender, race or religion • Liaising with and providing support to other team members • Working as part of a team • Identifying and managing performance required to meet internal and external customer needs in own work and team • Managing technical processes and providing problem-solving support to others
Problem solving	• Investigating problem causes • Identifying, rectifying or reporting potential difficulties associated with manufacture of products or provision of services • Identifying environmental features, regulations, insurance requirements, legal requirements and other factors which may affect the product or service to be provided • Using material and process knowledge to solve problems • Identifying hazards and suggesting control measures • Determining production requirements • Conducting tests and analysing results to determine and assess production requirements
Initiative and enterprise	• Seeking feedback on products, processes and procedures • Gathering and analysing information and applying to work-related processes • Recording information on the quality and other indicators of products • Supporting achievement of efficient production processes • Determining and acting on situations requiring further information or problem solving
Planning and organising	• Identifying hazards and implementing appropriate hazard control measures • Demonstrating time-management skills • Sourcing and preparing materials and resources • Sequencing work to maximise safety and productivity
Self-management	• Interpreting and applying relevant Acts and regulations • Keeping the work area clean and tidy at all times • Monitoring own work and work of team, and identifying and acting on any quality issues • Understanding own work activities • Managing own time to meet deadlines • Implementing workplace procedures and instructions

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Learning	• Implementing learning activities as appropriate to ensure achievement of specified production requirements • Assessing competencies in meeting job requirements • Being supportive and assertive, and using interpersonal skills • Identifying own training needs and seeking skill development if required • Gathering feedback on own work to assess effectiveness in meeting objectives and integrating information into own practice
Technology	• Using computer software applications effectively • Working with technology safely and according to workplace standards • Helping others use technology efficiently and safely • Using testing technology

Packaging Rules

Packaging Rules

To be awarded the Certificate IV in Recreational Vehicles competency must be achieved in **thirty two** (**32**) units of competency:

- **three** (**3**) core units of competency
- **twenty nine** (**29**) elective units of competency, as specified below:

  - a minimum of **two** (**2**) units of competency must be selected from Group A
  - a maximum of **fourteen** (**14**) units of competency may be selected from Groups C and D, with a maximum of **six** (**6**) from Group D
  - the balance of units must be selected from Groups A and B to bring the total to twenty nine (29).

Note: Up to **seven** (**7**) elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, as specified in Groups A, B, C and D.

Note: Where prerequisite units are identified, they must be counted in the total number of units required for completion of the qualification.

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Core units of competency

Unit code	Unit title	Prerequisites
MSAENV272B	Participate in environmentally sustainable work practices	
MSAPMOHS200A	Work safely	
MSAPMSUP102A	Communicate in the workplace	

Elective units of competency

Group A

Unit code	Unit title	Prerequisites
AURATA3005	Estimate complex jobs	
AURANN4001	Prepare a vehicle repair quotation	
AURV365356A	Read and interpret vehicle body repair estimation/quotation	
AURVTN4032	Determine vehicle body damage and recommend repair procedures	
MEM03006B	Set assembly stations	*
MEM16012A	Interpret technical specifications and manuals	
MSARVS401A	Assess and quote to service a recreational vehicle	
Up to **one** (**1**) relevant elective unit of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where it is available for inclusion at Certificate IV.		

Group B

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Unit code	Unit title	Prerequisites
AUMGTT001	Apply trim to vehicle components	
AURETR2015	Inspect and service batteries	
AURETR2012	Test and repair basic electrical circuits	
AURETR2010	Fabricate, test and repair wiring harnesses and looms	
AURETB3001	Repair electric braking systems	
AURTTB2001	Inspect and service braking systems	
AURTTD2004	Inspect and service suspension systems	
AURTTJ2002	Remove and refit wheel hubs and associated brake components	
AURTTA3017	Carry out vehicle safety and roadworthy inspection	
AURVTN2005	Remove and fit protector mouldings, transfers and decals	
AURVTP2007	Apply paint touch-up techniques	
AURVTS3004	Repair fibreglass and composite material components	
AURTTY3001	Repair chassis, frame and associated components	
AURVTT3015	Fabricate canvas products	
AURVTT3016	Fabricate frame structures	
AURVTT3019	Fabricate and install canopies and curtains	
AURVTG3011	Install side windows	
MEM03001B	Perform manual production assembly	
MEM05005B	Carry out mechanical cutting	*
MEM05012C	Perform routine manual metal arc welding	
MEM05050B	Perform routine gas metal arc welding	
MEM10002B	Terminate and connect electrical wiring	*

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Unit code	Unit title	Prerequisites
MEM12002B	Perform electrical/electronic measurement	
MEM12023A	Perform engineering measurements	
MEM18001C	Use hand tools	
MEM18002B	Use power tools/hand held operations	
MEM18038B	Maintain wheels and tyres	*
MEM18045B	Fault find/repair electrical equipment/components up to 250 volts single phase supply	*
MSAPMOPS101A	Make measurements	
MSARVS202A	Repair/service LP gas systems in a recreational vehicle	
PMBPROD221B	Operate rotational moulding equipment	
PMBPROD321B	Produce rotational moulded products	*
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate IV.		

Group C

Unit code	Unit title	Prerequisites
AURAFA2004	Solve routine problems in an automotive workplace	
AURAKA3002	Adapt work processes to new technologies	
AURAMA5006	Contribute to business improvement	
MEM13002B	Undertake occupational health and safety activities in the workplace	

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Unit code	Unit title	Prerequisites
MEM13010A	Supervise occupational health and safety in an industrial work environment	*
MEM14001B	Schedule material deliveries	
MEM14002B	Undertake basic process planning	
MEM14003B	Undertake basic production scheduling	
MEM15002A	Apply quality systems	
MEM15004B	Perform inspection	
MEM15005B	Select and control inspection processes and procedures	*
MEM16002C	Conduct formal interviews and negotiations	
MEM16006A	Organise and communicate information	
MEM22015A	Source and estimate engineering materials requirements	*
MEM30013A	Assist in the preparation of a basic workplace layout	
MSS402002A	Sustain process improvements	
MSS402081A	Contribute to the application of a proactive maintenance strategy	
MSS403002A	Ensure process improvements are sustained	
MSS403011A	Facilitate implementation of competitive systems and practices	
MSS403021A	Facilitate a Just in Time system	
MSS403040A	Facilitate and improve implementation of 5S	
MSS403041A	Facilitate breakthrough improvements	
MSS403051A	Mistake proof an operational process	
MSS404082A	Assist in implementing a proactive maintenance strategy	

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Unit code	Unit title	Prerequisites
MSAENV472B	Implement and monitor environmentally sustainable work practices	
MSAPMSUP200A	Achieve work outcomes	
MSAPMSUP383A	Facilitate a team	
MSAPMSUP390A	Use structured problem solving tools	
PSPGOV408A	Value diversity	
TAEASS401B	Plan assessment activities and processes	
TAEASS402B	Assess competence	
TAEASS403B	Participate in assessment validation	
TAEDEL301A	Provide work skill instruction	
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate IV.		

Group D

Unit code	Unit title	Prerequisites
MEM09002B	Interpret technical drawing	
MEM11011B	Undertake manual handling	
MEM14004A	Plan to undertake a routine task	
MEM15024A	Apply quality procedures	
MSS402021A	Apply Just in Time procedures	
MSS402040A	Apply 5S procedures	
MSS402080A	Undertake root cause analysis	
MSAPMOHS220A	Provide initial first aid response	

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Unit code	**Unit title**	**Prerequisites**
MSAPMOPS212A	Use enterprise computers or data systems	
MSAPMSUP100A	Apply workplace procedures	
MSAPMSUP101A	Clean workplace or equipment	
MSAPMSUP106A	Work in a team	
MSAPMSUP280A	Manage conflict at work	
MSAPMSUP291A	Participate in continuous improvement	
MSARVS301A	Develop and update caravan industry knowledge	
MSARVG201A	Tow a recreational vehicle safely	
MSARVT201A	Apply technical knowledge of recreational vehicle manufacturing to work activities	
SIRXSLS002A	Advise on products and services	
TLID2010A	Operate a forklift	
UEGNSG604B	Fill gas cylinders	
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate IV.		

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MSA40710 Certificate IV in Recreational Vehicle and Accessories Retailing

Modification History

Release 5 - Imported elective unit replaced by current release.

Release 4 - Imported elective units replaced by current versions. Prerequisites replaced by an asterisk. Equivalent.

Release 3 - MSACM unit replaced by MSS unit from MSS11v2 Sustainability Training Package. Imported unit version coded updated.

Release 2 - Imported unit code updated.

Description

This qualification covers the skills and knowledge designed to reflect the role of a supervisor or assistant manager in a recreational vehicle retail outlet.

Job roles/employment outcomes

The Certificate IV in Recreational Vehicle and Accessories Retailing has been developed as a post-trade level qualification for use in MSA07 Manufacturing Training Package. This qualification has been developed in response to an industry request. People with this qualification would be expected to lead sales teams and provide supervision of people in the sale of recreational vehicles and accessories, including:

- motor homes
- caravans
- camper trailers
- slide-ons
- fifth wheelers

to meet Australian requirements, such as road worthiness and the Australian Design Rule (ADR). They will provide technical leadership as well as undertake some tasks themselves.

They may work in a service and repair facility or a manufacturer's factory undertaking sales work. Sales may be for a new recreational vehicle, a second-hand/refurbished recreational vehicle or spare parts and accessories. In some cases selling of the recreational vehicle may also include possible modifications which could be made to the recreational vehicle.

Application

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The sector typically manufactures, services and repairs recreational vehicles as required. Recreational vehicle sales requires specialised knowledge not only of the available range of recreational vehicle models and accessories but of the legal requirements associated with weight, towing and vehicle capacity.

Recreational vehicles may be made from a frame (timber, aluminium or steel) and skin (aluminium or fibre composite) or a manufactured wall panel or some other technology. They are typically mounted on a steel chassis which may be manufactured by the recreational vehicle manufacturer or bought. Fittings are typically timber/particle board but may be any other suitable material.

People with this qualification may be expected to:

- sell a new or second-hand recreational vehicle
- suggest modifications/refits to a recreational vehicle
- prepare a recreational vehicle for sale/resale
- sell spare parts and accessories
- manage a sales area/showroom.

This work will generally be undertaken in a workshop or showroom environment.

Training programs for this qualification are suitable to be undertaken as part of a formal training contract with an employer under an Australian Traineeship or Apprenticeship arrangement.

Pathways into the qualification

This qualification may be accessed by direct entry.

The units of competency contained within this qualification are common with other qualifications and credit should be granted towards this qualification where competency has already been achieved.

Credit should also be granted towards this qualification where competency has been achieved in units of competency contained within relevant skill sets.

The units of competency in this qualification reflect competencies which are practiced within the industry and recognition of prior learning (RPL) should be granted where there is sufficient evidence of competency from work-based experience.

Pathways from the qualification

Further qualification pathways from this qualification include MSA50510 Diploma of Recreational Vehicles.

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Additional qualification advice

MSA41108 Certificate IV in Competitive Manufacturing is available for team leaders or others who need a more generalist qualification covering the application of good manufacturing practice and lean principles.

Licensing considerations

Units of competency in this qualification provide the underpinning knowledge and skills for various required licenses. Local regulations should be checked for details.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification**
Communication	• Negotiating effectively with team members and other managers on business values, directions and day-to-day operational matters • Reading, analysing and communicating workplace information to team members and other managers • Writing reports and completing business documentation in the context of the job role
Teamwork	• Leading a retail or wholesale business team, and mentoring and supporting team members in the context of a retail supervision or management role • Effectively participating in wider retail business supervisory/management teams • working independently to complete own tasks and supporting

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	other team members, where appropriate
Problem solving	• Implementing customer service strategies • Anticipating problems and acting to mitigate where possible • Solving a range of operational retail or wholesale operational business problems, individually or in the context of a wider team management structure • Clarifying issues and applying existing policies and infrastructure to source information and resources, and developing practical and sustainable solutions
Initiative and enterprise	• Creating an operational business team customer service and continuous improvement environment across all performance areas • Providing positive feedback, encouraging team members to do things better and be personally receptive to team members ideas • Translating ideas into action by positively accepting and initiating changes in procedures or arrangements at the business level
Planning and organising	• Establishing and communicating clear goals and deliverables for self and team members within the context of organisation objectives and the current business situation • Coordinating resources to ensure that work is carried out according to timelines and priorities • Coordinating and/or implementing changes arising from continuous improvement processes
Self-management	• Understanding how own personal job role fits into the context of the wider business values and directions • Working within the retail or wholesale business culture by practising inclusive behaviour, effective management of personal presentation, hygiene, and time • Efficiently prioritising and completing delegated tasks • Maintaining own knowledge of the job role, reviewing own performance and actively seeking and acting upon advice and guidance
Learning	• Identifying personal strengths and weaknesses in the context of the job role and recognising how to personally learn best at work • Seeking opportunities for formal education in the context of a current role or future retail job opportunities • Accepting opportunities to learn new ways of doing things and sharing knowledge and skills with other business managers and team members
Technology	• Adapting to new business related technology skill requirements

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• Selecting and using retail or other information and communications technology, where relevant, to support business operations and planning in the context of key business performance objectives and personal job role

Packaging Rules

Packaging Rules

To be awarded the Certificate IV in Recreational Vehicle and Accessories Retailing competency must be achieved in **thirty two** (**32**) units of competency:

- **three** (**3**) core units of competency
- **twenty nine** (**29**) elective units of competency, as specified below:

  - a minimum of **two** (**2**) units of competency must be selected from Group A
  - a maximum of **fourteen** (**14**) units of competency may be selected from Groups C and D, with a maximum of **six** (**6**) from Group D
  - the balance of units must be selected from Groups A and B to bring the total to twenty nine (29).

Note: Up to **seven** (**7**) relevant units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, as specified in Groups A, B, C and D.

Note: Where prerequisite units are identified, they must be counted in the total number of units required for completion of the qualification.

Core units of competency

Unit code	Unit title	Prerequisites
MSAENV272B	Participate in environmentally sustainable work practices	
MSAPMOHS200A	Work safely	

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Unit code	Unit title	Prerequisites
MSAPMSUP102A	Communicate in the workplace	

Elective units of competency

Group A

Unit code	Unit title	Prerequisites
AURACA3002	Establish customer requirements of a complex nature	
AURATA3005	Estimate complex jobs	
AURANN4001	Prepare a vehicle repair quotation	
AURV365356A	Read and interpret vehicle body repair estimation/quotation	
AURVTN4032	Determine vehicle body damage and recommend repair procedures	
MEM16003B	Provide advanced customer service	
MEM16012A	Interpret technical specifications and manuals	
SIRXMER303	Coordinate merchandise presentation	
SIRXMER004A	Manage merchandise and store presentation	
SITXMPR404	Coordinate marketing activities	
Up to **one** (**1**) relevant elective unit of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where it is available for inclusion at Certificate IV.		

Group B

Unit code	Unit title	Prerequisites
AUMANA001	Prepare and document quotations	

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Unit code	Unit title	Prerequisites
AURACA2001	Establish relations with customers	
AURC341903A	Apply relevant finance, leasing and insurance contracts/policies	
AURACA3003	Build customer relations	
AURAMA3004	Maintain business image	
AURAMA4005	Manage complex customer issues	
AURSCA2002	Present stock and sales area	
AURSCA2003	Apply sales procedures	
AURSCA2004	Carry out cash, credit and funds transfers	
AURSCA2005	Sell products	
AURSCA2006	Promote products and services	
AURSAA2001	Process customer complaints	
BSBCUS501C	Manage quality customer service	
SIRXCCS201	Apply point-of-sale handling procedures	
SIRXINV004A	Buy merchandise	
SIRXRSK001A	Minimise theft	
SIRXRSK002A	Maintain store security	
SIRXSLS002A	Advise on products and services	
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate IV.		

Group C

Unit code	Unit title	Prerequisites
AURAAA4002	Determine retail rates for work	

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Unit code	Unit title	Prerequisites
AURAFA2004	Solve routine problems in an automotive workplace	
AURAKA3002	Adapt work processes to new technologies	
AURAMA5006	Contribute to business improvement	
MEM13002B	Undertake occupational health and safety activities in the workplace	
MEM13010A	Supervise occupational health and safety in an industrial work environment	*
MEM15002A	Apply quality systems	
MEM15004B	Perform inspection	
MEM16002C	Conduct formal interviews and negotiations	
MEM16006A	Organise and communicate information	
MEM22015A	Source and estimate engineering materials requiremetns	*
MSS403040A	Facilitate and improve implementation of 5S	
MSAENV472B	Implement and monitor environmentally sustainable work practices	
MSAPMSUP200A	Achieve work outcomes	
MSAPMSUP383A	Facilitate a team	
MSAPMSUP390A	Use structured problem solving tools	
MSARVS401A	Assess and quote to service a recreational vehicle	
PSPGOV408A	Value diversity	
SITXMG501	Establish and conduct business relationships	
TAEASS401B	Plan assessment activities and processes	
TAEASS402B	Assess competence	
TAEASS403B	Participate in assessment validation	

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Unit code	Unit title	Prerequisites
TAEDEL301A	Provide work skill instruction	
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate IV.		

Group D

Unit code	Unit title	Prerequisites
AURSCA2001	Select automotive parts and products	
AURSLA2001	Apply legal requirements relating to product sales	
AURSBA3002	Apply automotive parts interpretation process	
AURTTA3017	Carry out vehicle safety and roadworthy inspection	
MSAPMOHS220A	Provide initial first aid response	
MSAPMOPS212A	Use enterprise computers or data systems	
MSAPMSUP100A	Apply workplace procedures	
MSAPMSUP106A	Work in a team	
MSAPMSUP280A	Manage conflict at work	
MSAPMSUP291A	Participate in continuous improvement	
MSARVS301A	Develop and update caravan industry knowledge	
MSARVG201A	Tow a recreational vehicle safely	
SITXMPR401	Coordinate production of brochures and marketing materials	
SITXMPR402	Create a promotional display or stand	
UEGNSG604B	Fill gas cylinders	

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Unit code	Unit title	Prerequisites
Up to **two** (**2**) relevant elective units of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses, where they are available for inclusion at Certificate IV.		

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MSA50108 Diploma of Manufacturing Technology

Modification History

Release 4 - Imported elective units replaced by current versions. Equivalent.

Release 3 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package.

Release 2 - Imported unit codes updated.

Description

This qualification would normally be delivered part time over a three year period. There are three specialist streams available:

- Metallurgy
- Polymer technology
- Structural steel detailing.

Each stream offers an opportunity for significant choice in electives and each stream requires the same core units to be completed.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

MSA50108 Diploma of Manufacturing Technology

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The following table contains a summary of the employability skills as identified by the manufacturing technology related industries for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that reflect skill requirements for this level.

Employability skill	**Industry/enterprise requirements for this qualification include**:
Communication	• complete workplace documentation and records • use communication technologies efficiently • develop work instructions, specifications and procedures • demonstrate effective and appropriate communication and interpersonal skills when dealing with people from NESB • communicate with all team members • demonstrate effective and appropriate communication and interpersonal skills when dealing with clients • use most appropriate communication method given priority, cost and customer facilities • access, interpret and apply technical information
Teamwork	• work cooperatively with people of different ages, gender, race or religion • liaise with and provide support to other team members • work as part of a team • identify and manage performance required to meet internal and external customer needs in own work and team • manage technical processes and provide problem solving support to others
Problem solving	• investigate problem causes • identify, rectify or report potential difficulties associated with manufacture of products or provision of services • identify environmental features, regulations, insurance requirements, legal requirements and other factors which may affect the product or service to be provided • use material and process knowledge to solve problems • identify hazards and suggest control measures • determine production requirements • conduct tests and analyse results to determine and assess production requirements
Initiative and enterprise	• seek feedback on products, processes and procedures • gather and analyse information and apply to work related processes • record information on the quality and other indicators of products

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Employability skill	**Industry/enterprise requirements for this qualification include**:
	• support achievement of efficient production processes • determine and act on situations requiring further information or problem solving
Planning and organising	• identify hazards and implement appropriate hazard control measures • demonstrate time management skills • source and prepare materials and resources • sequence work to maximise safety and productivity
Self management	• interpret and apply relevant acts and regulations • keep the work area clean and tidy at all times • monitor own work and work of team and identify and act on any quality issues • understand own work activities • manage own time to meet deadlines • implement workplace procedures and instructions
Learning	• implement learning activities as appropriate to ensure achievement of specified production requirements • assess competencies in meeting job requirements • be supportive, assertive and use interpersonal skills • identify own training needs and seek skill development if required • gather feedback to own work to assess effectiveness in meeting objectives and integrate information into own practice
Technology	• use computer software applications effectively • work with technology safely and according to workplace standards • help others use technology efficiently and safely • use testing technology

Packaging Rules

Packaging Rules

To be awarded a Diploma of Manufacturing Technology competency must be achieved in **twenty one** (**21**) units of competency:

- **five** (**5**) core units of competency

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- **sixteen** (**16**) elective units of competency chosen as described below.
-

Core units

The following **five** (**5**) units must be chosen.

Unit code	Unit title
MEM16006A	Organise and communicate information
MEM16008A	Interact with computing technology
MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment
MSS402051A	Apply quality standards
MSAENV272B	Participate in environmentally sustainable work practices

Prerequisites

Units marked with an asterisk have one or more prerequisite requirements. The prerequisites for these units are to be counted in the total number of units required in the elective group. Please refer to the individual units for details.

Elective units

Group A - specialist streams

Choose **sixteen** (**16**) elective units as specified to achieve a specialist stream.

Note:

- All units from each specialist stream are available in Group B as General Electives.
- Four elective units may also be chosen from other qualifications in this Training Package, other endorsed Training Packages and accredited courses, as specified below.

Metallurgy specialist stream

Select **sixteen** (**16**) elective units:

- a minimum of **ten** (**10**) from the list below
- the balance may be chosen from Group B

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Note:

- at least four (4) of the ten (10) metallurgy elective units must be coded MSATCM5---.
- the unit MSATCM406A Apply basic chemistry principles to metallurgy must also be selected if it has not already been completed as part of a lower qualification.

Unit code	**Unit title**	**Prerequisites**
MEM23004A	Apply technical mathematics	
MEM23063A	Select and test mechanical engineering materials	*
MEM23109A	Apply engineering mechanic principles	*
MEM24012C	Apply metallurgy principles	
MEM30007A	Select common engineering materials	
MSATCM401A	Prepare and examine metallographic samples	
MSATCM402A	Monitor and test sands, cores and moulds	
MSATCM403A	Evaluate mould design and gating	
MSATCM404A	Undertake and interpret results of chemical analysis on metal samples	
MSATCM405A	Determine and supervise heat treatment of metal	*
MSATCM406A	Apply basic chemistry principles to metallurgy	
MSATCM501A	Calculate and predict chemical outcomes in metallurgical situations	*
MSATCM502A	Identify and describe equipment for mineral and chemical processing plants	*
MSATCM503A	Recommend a refractory for an application	
MSATCM504A	Select metal forming process	*
MSATCM505A	Select metal joining process	*
MSATCM506A	Monitor blast furnace operations	*
MSATCM507A	Monitor primary steel making process	*

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Unit code	Unit title	Prerequisites
MSATCM508A	Monitor secondary steelmaking operations	*
MSATCM509A	Recommend ferrous and non ferrous metals or alloys for an application	*
MSATCM510A	Apply metallurgical principles and techniques in welding and other thermal processes	*
MSATCM511A	Apply metallurgy principles and practice to determine metal forming and shaping processes	
MSATCM512A	Apply metallurgy principles and practice to optimise furnace operation	
MSATCM513A	Plan and complete metallurgical projects	*
MSATCM514A	Select surface treatment methods for metallic components or products	
MSATCM515A	Analyse metallurgical failures of components and recommend preventative measures	*
MSATCM516A	Select non-metallic materials for engineering applications manufacturing, engineering and structural	
MSATCM517A	Determine corrosion prevention strategies for metal and alloys	
MSATCM518A	Interpret complex binary phase diagrams	*

Polymer technology specialist stream

Select **sixteen** (**16**) elective units:

- a minimum of **eight** (**8**) from the list below
- the balance may be chosen from Group B

Unit code	Unit title	Prerequisites

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Unit code	Unit title	Prerequisites
MSS405075A	Facilitate the development of a new product	*
PMAOPS550B	Develop a colour formulation	*
PMBTECH501B	Analyse equipment performance	*
PMBTECH502B	Review and analyse production trials and specify re-trials	*
PMBTECH503B	Determine rheology and output of plastics materials from processing equipment	*
PMBTECH504B	Determine heat transfer loads for processing equipment	
PMBTECH505B	Choose polymer materials for an application	*
PMBTECH506B	Analyse the design of products and tools	*
PMBTECH507B	Develop fibre composite products using cored laminate techniques	*
PMBTECH508A	Develop a new compound	
PMBTECH509A	Modify an existing product	
PMBTECH510A	Analyse failure in polymeric materials	

Group C - Structural steel detailing specialist stream

Select **sixteen** (**16**) elective units:

- a minimum of **ten** (**10**) from the two groups below
- the balance may be chosen from Group B

Structural steel detailing - Group 1

All seven (7) of these specialist stream units must be chosen from this group.

Unit code	Unit title	Prerequisites

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Unit code	Unit title	Prerequisites
MSATCS301A	Interpret architectural and engineering design specifications for structural steel detailing	*
MSATCS302A	Detail bolts and welds for structural steelwork connections	*
MSATCS501A	Detail standardised structural connections	*
MSATCS502A	Detail structural steel members	*
MSATCS503A	Incorporate structural steel detailing into fabrication and construction project management	
MEM05051A	Select welding processes	
MEM09002B	Interpret technical drawing	

Structural steel detailing - Group 2

Three (3) units must be chosen from the list below.

Unit code	Unit title	Prerequisites
MSATCS504A	Detail ancillary steelwork	*
MEM09006B	Perform advanced engineering detail drafting	*
MEM09009C	Create 2D drawings using computer aided design system	*
MEM16012A	Interpret technical specifications and manuals	
MEM30031A	Operate computer-aided design (CAD) system to produce basic drawing elements	
MEM30032A	Produce basic engineering drawings	
MEM30033A	Use computer-aided design (CAD) to create and display 3-D models	*

Group B - General electives

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The balance of units for each specialist stream may be chosen from this list as specified below:

Metallurgy specialist stream	Up to six units
Polymer technology specialist stream	Up to eight units
Structural steel detailing	Up to six units

Unit code	**Unit title**	**Prerequisites**
AUM4003A	Interpret customer requirements	
FDFOP2005A	Work in a socially diverse environment	
LMTGN4016A	Contribute to the development of products or processes	
MEM06003C	Carry out heat treatment	
MEM09002B	Interpret technical drawing	
MEM09204A	Produce basic engineering detail drawings	*
MEM09205A	Produce electrical schematic drawings	*
MEM09005B	Perform basic engineering detail drafting	*
MEM09011B	Apply basic engineering design concepts	*
MEM09216A	Interpret and produce curved 3-D shapes and patterns	
MEM09157A	Perform mechanical engineering design drafting	
MEM09158A	Perform mechatronic engineering design drafting	
MEM09155A	Prepare mechanical models for computer-aided engineering (CAE)	*
MEM09156A	Prepare mechatronic models for computer-aided engineering (CAE)	*
MEM12003B	Perform precision mechanical measurement	

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Unit code	Unit title	Prerequisites
MEM12005B	Calibrate measuring equipment	*
MEM12022B	Program coordinate measuring machine (advanced)	
MEM12023A	Perform engineering measurements	
MEM12024A	Perform computations	
MEM12025A	Use graphical techniques and perform simple statistical computations	
MEM13002B	Undertake occupational health and safety activities in the workplace	
MEM13010A	Supervise occupational health and safety in an industrial work environment	*
MEM13013B	Work safely with ionising radiation	
MEM13014A	Apply principles of occupational health and safety in the work environment	
MEM14001B	Schedule material deliveries	
MEM14002B	Undertake basic process planning	
MEM14003B	Undertake basic production scheduling	
MEM14004A	Plan to undertake a routine task	
MEM14005A	Plan a complete activity	
MEM14085A	Apply mechanical engineering analysis techniques	*
MEM14086A	Apply mechatronic engineering analysis techniques	*
MEM14087A	Apply manufactured product design techniques	*
MEM14088A	Apply maintenance engineering techniques to equipment and component repairs and modifications	*
MEM14089A	Integrate mechanical fundamentals into an engineering task	*

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Unit code	Unit title	Prerequisites
MEM14090A	Integrate mechatronic fundamentals into an engineering task	*
MEM14091A	Integrate manufacturing fundamentals into an engineering task	*
MEM14092A	Integrate maintenance fundamentals into an engineering task	*
MEM15001B	Perform basic statistical quality control	
MEM15004B	Perform inspection	
MEM15005B	Select and control inspection processes and procedures	
MEM15007B	Conduct product and/or process capability studies	*
MEM15008B	Perform advanced statistical quality control	*
MEM15010B	Perform laboratory procedures	
MEM15011B	Exercise external quality assurance	*
MEM15012B	Maintain/supervise application of quality procedures	*
MEM16005A	Operate as a team member to conduct manufacturing, engineering or related activities	
MEM16007A	Work with others in a manufacturing, engineering or related environment	
MEM16010A	Write reports	*
MEM18001C	Use hand tools	
MEM18002B	Use power tools/hand held operations	
MEM18003C	Use tools for precision work	
MEM18006C	Repair and fit engineering components	
MEM18010C	Perform equipment condition monitoring and recording	

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Unit code	Unit title	Prerequisites
MEM18016B	Analyse plant/equipment condition monitoring results	*
MEM18055B	Dismantle, replace and assemble engineering components	
MEM22002A	Manage self in the engineering environment	*
MEM22012A	Coordinate resources for an engineering project or operation	
MEM22013A	Coordinate engineering projects	
MEM22014A	Coordinate engineering-related manufacturing operations	*
MEM22015A	Source and estimate engineering materials requiremetns	
MEM22007A	Manage environmental effects of engineering activities	*
MEM22017A	Coordinate continuous improvement and technical development in an engineering-related project or operation	
MEM22018A	Coordinate sales and promotion of engineering-related products or services	
MEM23003A	Operate and program computers and/or controllers in engineering situations	*
MEM23004A	Apply technical mathematics	
MEM23006A	Apply fluid and thermodynamics principles in engineering	*
MEM23007A	Apply calculus to engineering tasks	*
MEM23041A	Apply basic scientific principles and techniques in mechanical engineering situations	
MEM23109A	Apply engineering mechanic principles	*
MEM23111A	Select electrical equipment and components for engineering applications	*

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Unit code	Unit title	Prerequisites
MEM23112A	Investigate electrical and electronic controllers in engineering applications	*
MEM23063A	Select and test mechanical engineering materials	*
MEM23064A	Select and test mechatronic engineering materials	*
MEM23113A	Evaluate hydrodynamic systems and system components	*
MEM23114A	Evaluate thermodynamic systems and components	*
MEM23115A	Evaluate fluid power systems	*
MEM23116A	Evaluate programmable logic contoller and related control system components	*
MEM23117A	Evaluate microcontroller applications	*
MEM23118A	Apply production and service control techniques	*
MEM23119A	Evaluate continuous improvement processes	*
MEM23120A	Select mechanical machine and equipment components	*
MEM23121A	Analyse loads on frames and mechanisms	*
MEM23122A	Evaluate computer integrated manufacturing systems	*
MEM23123A	Evaluate manufacturing processes	
MEM23124A	Measure and analyse noise and vibration	*
MEM23125A	Evaluate maintenance systems	*
MEM24002B	Perform penetrant testing	*
MEM24003B	Perform basic magnetic particle testing	*
MEM24004B	Perform magnetic particle testing	*
MEM24005B	Perform basic eddy current testing	*

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Unit code	Unit title	Prerequisites
MEM24006B	Perform eddy current testing	*
MEM24007B	Perform ultrasonic thickness testing	*
MEM24008B	Perform ultrasonic testing	*
MEM24009B	Perform basic radiographic testing	*
MEM24010B	Perform radiographic testing	*
MEM24011B	Establish non destructive tests	*
MEM30031A	Use computer-aided design (CAD) system to produce basic drawing elements	
MEM30032A	Produce basic engineering drawings	
MEM30033A	Use computer-aided design (CAD) to create and display 3-D models	*
MEM30005A	Calculate force systems within simple beam structures	*
MEM30006A	Calculate stresses in simple structures	*
MEM30007A	Select common engineering materials	
MEM30008A	Apply basic economic and ergonomic concepts to evaluate engineering applications	
MEM30009A	Contribute to the design of basic mechanical systems	*
MEM30013A	Assist in the preparation of a basic workplace layout	
MEM30014A	Apply basic just in time systems to the reduction of waste	
MEM30015A	Develop recommendations for basic set up time improvements	
MEM30016A	Assist in the analysis of a supply chain	
MEM30017A	Use basic preventative maintenance techniques and tools	

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Unit code	Unit title	Prerequisites
MEM30018A	Undertake basic process planning	
MEM30019A	Use resource planning software systems in manufacturing	*
MEM30020A	Develop and manage a plan for a simple manufacturing related project	
MEM30021A	Prepare a simple production schedule	
MEM30022A	Undertake supervised procurement activities	
MEM30023A	Prepare a simple cost estimate for a manufactured product	
MEM30024A	Participate in quality assurance techniques	*
MEM30027A	Prepare basic programs for programmable logic controllers	
MEM30028A	Assist in sales of technical products/systems	
MSS402002A	Sustain process improvements	
MSS402030A	Apply cost factors to work practices	
MSS402060A	Use planning software systems in operations	
MSS402061A	Use SCADA systems in operations	
MSS402080A	Undertake root cause analysis	
MSS403001A	Implement competitive systems and practices	
MSS403002A	Ensure process improvements are sustained	
MSS403010A	Facilitate change in an organisation implementing competitive systems and practices	
MSS403021A	Facilitate a Just in Time system	
MSS403030A	Improve cost factors in work practices	
MSS403032A	Analyse manual handling processes	
MSS403040A	Facilitate and improve implementation of 5S	

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Unit code	Unit title	Prerequisites
MSS403051A	Mistake proof an operational process	
MSS404050A	Undertake process capability improvements	
MSS404052A	Apply statistics to operational processes	
MSS404060A	Facilitate the use of planning software systems in a work area or team	
MSS404061A	Facilitate the use of SCADA systems in a team or work area	
MSS404081A	Undertake proactive maintenance analyses	
MSS404082A	Assist in implementing a proactive maintenance strategy	
MSS405001A	Develop competitive systems and practices for an organisation	
MSS405002A	Analyse and map a value stream	
MSS405003A	Manage a value stream	
MSS405004A	Develop business plans in an organisation implementing competitive systems and practices	
MSS405010A	Manage relationships with non-customer external organisations	
MSS405011A	Manage people relationships	
MSS405012A	Manage workplace learning	
MSS405020A	Develop quick changeover procedures	
MSS405021A	Develop a Just in Time system	
MSS405030A	Optimise cost of product or service	
MSS405031A	Undertake value analysis of a product or process costs in terms of customer requirements	
MSS405040A	Manage 5S system in an organisation	
MSS405050A	Determine and improve process capability	*

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Unit code	Unit title	Prerequisites
MSS405060A	Develop the application of enterprise control systems in an organisation	
MSS405061A	Determine and establish information collection requirements and processes	
MSS405070A	Develop and manage sustainable energy practices	
MSS015002A	Develop strategies for more sustainable use of resources	
MSS405075A	Facilitate the development of a new product	*
MSS405081A	Develop a proactive maintenance strategy	
MSAENV472B	Implement and monitor environmentally sustainable work practices	
MSAENV672B	Develop workplace policy and procedures for environmental sustainability	
MSAPMOPS400A	Optimise process/plant area	*
MSAPMOPS401A	Trial new process or product	
MSAPMSUP303A	Identify equipment faults	
MSAPMSUP390A	Use structured problem solving tools	
MSATCM301A	Test the mechanical properties of materials	
MSATCM302A	Monitor basic ferrous melting and casting processes	
MSATCM303A	Monitor basic non-ferrous melting and casting processes	
MSATCM304A	Interpret basic binary phase diagrams	
MSATCM305A	Demonstrate basic knowledge of casting operations	
PMAOPS350B	Match and adjust colour	
PMAOPS450B	Solve colour problems	

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Unit code	Unit title	Prerequisites
PMBPREP304C	Set a die	
PMBPREP305B	Change extrusion die and calibration setup	
PMBPROD235C	Use materials and process knowledge to complete work operations	
PMBPROD430B	Trial a new die/tool	
PMBPROD431B	Trial a new, advanced or complex mould	
PMBTECH301B	Use material and process knowledge to solve problems	
PMBTECH302A	Modify existing compounds	
PMBTECH303A	Make minor modifications to products	
PMBTECH401B	Predict polymer properties and characteristics	*
PMBTECH402B	Set up and remove complex dies	
PMBTECH406A	Diagnose production equipment problems	
MSL973001A	Perform basic tests	
MSL973006A	Prepare trial batches for evaluation	
MSL973007A	Perform microscopic examination	
MSL974001A	Prepare, standardise and use solutions	
MSL974003A	Perform chemical tests and procedures	
MSL974005A	Perform physical tests	
MSL974010A	Perform mechanical tests	
MSL975016A	Perform complex tests to measure engineering properties of materials	
	A maximum of four (4) general elective units may be chosen from this Training Package, other endorsed Training Packages and accredited courses where those units are available for inclusion at Diploma	

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Unit code	Unit title	Prerequisites
	level.	

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MSA50311 Diploma of Production Management

Modification History

Release 4 - Correction to metadata to show PMAOPS500A as available in this qualification

Release 3 - One imported elective unit updated to current version. Equivalent.

Release 2 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package.

Release 1 - New qualification

Description

This qualification provides the skills and knowledge required to plan, direct and coordinate production activities in a manufacturing environment. The qualification has been developed with the process manufacturing sector as a focus. It may also be applied to other organisations in the value chain.

The qualification packaging has been developed on an assumption that competency will be developed through a combination of on and off-the-job learning strategies. The qualification may also be achieved through recognition processes.

Job roles/employment outcomes

The MSA50311 Diploma of Production Management specifies the competencies required for employment in job roles related to assisting organisations to improve production.

Employment outcomes related to this qualification may include roles such as a production or operations manager.

Application

This qualification provides skills that can be applied to the design and control of production systems within an organisation, including:

- planning and scheduling
- tracking and analysing
- directing and operating.

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Pathways Information

Pathways into the qualification

This qualification has no entry requirement. However, entrants for the qualification should already possess operational or technical skills related to the organisation seeking production improvements either through prior relevant experience or qualifications. For this reason the qualification is not suitable as an entry level qualification for school leavers.

The units of competency in this qualification reflect competencies which are practised within the industry and recognition of prior learning (RPL) should be granted where there is sufficient evidence of competency from work-based experience.

Additional qualification advice

This qualification provides the skills needed to assist organisations to improve production where competitive manufacturing (lean) processes are not fully employed. It therefore complements but does not duplicate qualifications supplying skills related to competitive manufacturing. Where these skills are required MSA51108 Diploma of Competitive Manufacturing, should be considered.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	• Manage implementation of production improvement procedures and develop and distribute related information

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	• Develop standardised documentation on behalf of an area or group of work teams • Share and discuss information with others about enterprise activities • Develop and communicate workplace procedures • Provide information and clarifications to team leaders and other employees on workplace procedures in relation to production • Provide and interpret instructions, specifications, standard operating procedures and other work-related documents • Provide assistance or information to relevant personnel • Debrief on workplace changes with relevant stakeholders • Record production, emissions and other work-related information • Access and use workplace communication tools and equipment • Apply numeracy skills to work procedures • Provide information about team activities to managers, supervisors and customers
Teamwork	• Identify roles of work teams where teamwork is used as the form of work organisation • Supervise and lead others in a production environment • Share work-related information with peers, including team members, supervisors and management • Identify hazards to employees and visitors • Identify the value chain and advise other employees as to how they can contribute to the final quality of the product • Review changes to work practices and work relationships with team leaders and other employees • Provide assistance with planning work operations, as required • Seek assistance with work operations from specialists and other employees, as required • Participate in multidisciplinary teams, as required
Problem-solving	• Monitor production and maintenance activities • Analyse inconsistencies, non-compliances, faults or hazards • Identify factors within work area that are a constraint to work efficiency or reaching of production outcomes • Identify essential and non-essential practices • Implement methods of increasing features/benefits of products or processes • Monitor responsibilities of teams and make improvements to work organisation • Identify process steps which cause a problem and

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	implement improvement processes • Monitor production performance and implement improvement processes • Compare shift or area required performance with actual performance • Identify situations where compliance to specifications or safety standards is unlikely • Identify, recommend and implement improvements • Identify causes of identified faults and take appropriate action • Investigate causes of deviations from targets and standards in relation to production • Undertake root cause analysis
Initiative and enterprise	• Manage procedures and systems for optimum outcomes • Analyse feedback on procedures and systems • Analyse problems, implications or suggestions for improvements • Adjust work activities according to changes in customer requirements • Identify methods of increasing contribution of work teams to production • Identify and implement changes and improvements • Monitor processes and equipment to ensure cost efficiency • Implement and monitor work practices to reduce waste • Participate in multidisciplinary teams to develop new products or processes
Planning and organising	• Ensure work areas comply with sustainability obligations and requirements • Identify and manage processes, tools and materials • Implement improvements in accordance with procedures • Distinguish between essential and non-essential practices • Implement use of planning tools within work of teams • Determine and prioritise required actions • Collect, organise and analyse information from work activities • Monitor work activities according to safety and workplace standards • Set production targets and outcomes • Interpret data and information as required by own job • Ask questions to ensure there is understanding of work requirements in teams and among other employees
Self-management	• Recommend methods of increasing own contribution to the value chain

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	• Adjust work processes according to procedures and customer requirements • Identify and manage impact of change in own work • Minimise waste in own work activity • Assess own work performance • Set personal objectives for work performance • Manage own time
Learning	• Identify skill requirements of self and team members • Arrange skill development training for self and others • Adapt to changing work requirements • Ask questions to aid learning of others • Identify personal skill gaps and additional skill needs • Ask questions to ensure understanding of own work requirements • Monitor own work and identify areas for improvement • Seek feedback on work performance • Provide feedback on work performance to team leaders and team members
Technology	• Monitor technology to ensure production according to legislative requirements and workplace standards • Identify equipment and processes appropriate for jobs and skill levels of employees • Provide appropriate equipment to ensure safety and efficiency according to skill levels of employees • Assess operational efficiency of technology within own skill level and that of team members • Analyse data and other information from equipment reports • Conduct failure mode effects analyses • Use information technology appropriate for job • Manage maintenance procedures appropriate to job and processes according to skill levels of team members

Packaging Rules

To be awarded the MSA50311 Diploma of Production Management, competency must be achieved in **ten (10)** units of competency.

- **one (1)** core unit of competency
- **nine (9)** elective units of competency, as specified below

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Elective units must include:

- a minimum of **two (2)** units from each of Group A, Group B and Group C
- the balance of units, to a maximum of **three (3)**, can be selected from:
- units from Group A, B or C, not previously selected
- units available at Diploma level from this Training Package, other endorsed Training Packages and accredited courses.

Note: Units marked with an asterisk have one or more prerequisite requirements. Please refer to the individual units for details. Prerequisites are to be counted towards the total number required to complete the qualification.

Core units of competency

Unit code	Unit title
MSAENV472B	Implement and monitor environmentally sustainable work practices

Elective units of competency

Group A

Unit code	Unit title	Prerequisites
MSS405022A	Design a process layout	
MSS405030A	Optimise cost of product or service	
MSS405060A	Develop the application of enterprise control systems in an organisation	
MSS405075A	Facilitate the development of a new product	*
MSAPMOPS401A	Trial new process or product	
BSBFIM501A	Manage budgets and financial plans	

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FNSORG501A	Develop and manage a budget	
MEM14001B	Schedule material deliveries	
TLIL4059A	Implement asset management systems	
TLIL5055A	Manage a supply chain	
TLIP4013A	Implement and monitor logistics planning and process	
TLIR4008A	Implement and supervise stocktaking procedures	
TLIR4009A	Implement purchasing systems	
TLIR4010A	Plan purchasing	
TLIR5006A	Develop, implement and review purchasing strategies	
TLIX5015A	Establish supply chains	

Group B

Unit code	**Unit title**	**Prerequisites**
MSS402030A	Apply cost factors to work practices	
MSS404052A	Apply statistics to operational processes	
MSS405031A	Undertake value analysis of a product or process costs in terms of customer requirements	
MSS405032A	Analyse cost implications of maintenance strategy	
MSS405050A	Determine and improve process capability	*
MSS405053A	Manage application of six sigma for process control and improvement	*
MSS405061A	Determine and establish information collection requirements and processes	
MSS405081A	Develop a proactive maintenance strategy	
MSS405082A	Adapt a proactive maintenance strategy to the process operations sector	*

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MSAPMSUP390A	Use structured problem solving tools	
MSAPMSUP400A	Develop and monitor quality systems	
BSBMGT403A	Implement continuous improvement	
PMAOPS500A	Optimise production systems	

Group C

Unit code	Unit title	Prerequisites
MSS405041A	Implement improvement systems in an organisation	
MSS405070A	Develop and manage sustainable energy practices	
MSAENV672B	Develop workplace policy and procedures for environmental sustainability	
MSAPMOHS401A	Assess risk	
MSAPMOHS503A	Maintain the workplace OHS management system	
MSAPMOHS510A	Manage risk	*
BSBINM501A	Manage an information or knowledge management system	
BSBMGT502B	Manage people performance	
BSBWRK510A	Manage employee relations	
MEM11007B	Administer inventory procedures	
MSS015002A	Develop strategies for more sustainable use of resources	
MSS015015A	Evaluate sustainability impact of a process	
PMASUP520B	Review procedures to minimise environmental impact of process	
PSPPM501B	Design complex projects	
PSPPM502B	Manage complex projects	

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PSPPM503B	Close complex projects	
TLIA5058A	Manage facility and inventory requirements	
TLIR4003A	Negotiate a contract	
TLIR5005A	Manage a contract	

Custom Content Section

Not applicable.

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MSA50510 Diploma of Recreational Vehicles

Modification History

Release 5 - Imported elective unit updated to current release.

Release 4 - Imported elective units replaced by current versions. Prerequisites replaced with an asterisk. Equivalent.

Release 3 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package.

Release 2 - Imported unit code updated.

Description

The Diploma of Recreational Vehicles offers advanced training to people who may have completed MSA40510 Certificate IV in Recreational Vehicles or other relevant qualifications, or who have significant relevant industry experience without formal qualifications.

Job roles/employment outcomes

The Diploma of Recreational Vehicles has been developed to reflect the role of senior technicians and managers in a recreational vehicle manufacturing, repair or service enterprise for use in MSA07 Manufacturing Training Package. This qualification has been developed in response to an industry request. People with this qualification would be expected to undertake technical projects and/or manage departments or entire enterprises undertaking the manufacture, service and repair of recreational vehicles, including:

- motor homes
- caravans
- camper trailers
- slide-ons
- fifth wheelers.

They may work in a service and repair facility or a manufacturer's factory. The organisation may build new recreational vehicles, repair recreational vehicles for insurance claims, modify existing recreational vehicles or undertake routine servicing.

Application

The sector typically manufactures, services and repairs recreational vehicles as required. This may apply to the recreational vehicles body, fittings and running gear. Repairs may be in response to a road (or other) accident, hail damage, vehicle modification or routine servicing. They may also specify and access outside specialist services, for example, for spray painting or licence requirements.

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Recreational vehicles may be made from a frame (timber, aluminium or steel) and skin (aluminium or fibre composite) or a manufactured wall panel or some other technology. They are typically mounted on a steel chassis which may be manufactured by the recreational vehicle manufacturer or bought. Fittings are typically timber/particle board but may be any other suitable material.

People with this qualification may be expected to manage the work and perhaps undertake initial design or design modifications of a recreational vehicle, its repair or the process used.

This work will generally be undertaken in a workshop or factory facility.

Training programs for this qualification are suitable to be undertaken as part of a formal training contract with an employer under an Australian Traineeship or Apprenticeship arrangement.

Pathways into the qualification

This qualification may be accessed by direct entry.

The units of competency contained within this qualification are common with other qualifications and credit should be granted towards this qualification where competency has already been achieved.

Credit should also be granted towards this qualification where competency has been achieved in units of competency contained within relevant skill sets.

The units of competency in this qualification reflect competencies which are practiced within the industry and recognition of prior learning (RPL) should be granted where there is sufficient evidence of competency from work-based experience.

Pathways from the qualification

Currently are no higher recreational vehicle qualifications.

Additional qualification advice

MSA51108 Diploma of Competitive Manufacturing is available for managers or others who need a more generalist qualification covering the application of good manufacturing practice and lean principles.

Licensing considerations

Units of competency in this qualification provide the underpinning knowledge and skills for various required licenses. Local regulations should be checked for details.

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Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification**
Communication	• Managing implementation of occupational health and safety (OHS) procedures, and developing and distributing related safety information • Developing standardised documentation on behalf of an area or group of work teams • Sharing and discussing information with others about enterprise activities • Developing and communicating workplace procedures • Providing information and clarifications to team leaders and other employees on workplace procedures • Providing and interpreting instructions, specifications, standard operating procedures (SOPs) and other work-related documents • Providing assistance or information to relevant personnel • Debriefing on workplace changes with relevant stakeholders • Recording production or other work-related information • Accessing and using workplace communication tools and equipment • Applying numeracy skills to work procedures • Providing information about team activities to managers, supervisors and customers
Teamwork	• Identifying roles of work teams where teamwork is used as the form of work organisation

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• Supervising and leading others in a production environment • Sharing production or work-related information with peers, including team members, supervisors and management • Identifying hazards to employees and visitors • Identifying the value chain and advising other employees as to how they can contribute to the final quality of the product • Reviewing changes to work practices and work relationships with team leaders and other employees • Providing assistance with planning work operations, as required • Seeking assistance with work operations from specialists and other employees, as required • Participating in multidisciplinary teams, as required
Problem solving	• Monitoring production and maintenance activities • Analysing inconsistencies, non-compliances, faults or hazards • Identifying factors within work area that are a constraint to work efficiency or reaching of production outcomes • Identifying essential and non-essential practices • Implementing methods of increasing features/benefits of products or processes • Monitoring responsibilities of teams and making improvements to work organisation • Identifying process steps which cause a problem and implementing improvement processes • Monitoring OHS performance and implementing OHS improvement processes • Comparing shift or area required performance with actual performance • Identifying situations where compliance to specifications or safety standards is unlikely • Identifying, recommending and implementing improvements • Distinguishing between random and identifiable causes of work problems • Identifying causes of identified faults and taking appropriate action • Investigating causes of quality deviations • Undertaking root cause analysis • Identifying deviations and fault patterns
Initiative and enterprise	• Managing procedures and systems for optimum outcomes • Analysing feedback on procedures and systems • Analysing problems, implications or suggestions for improvements • Adjusting work activities according to changes in customer

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	requirements • Identifying methods of increasing contribution of work teams to the value chain • Identifying and implementing changes and improvements • Monitoring processes and equipment to ensure cost-efficiency • Managing 5S procedures • Implementing and monitoring work practices to reduce waste • Participating in multidisciplinary teams to develop new products or processes
Planning and organising	• Planning work of teams to meet required standards • Ensuring work areas comply with OHS procedures • Identifying and managing processes, tools and materials • Implementing improvements in accordance with procedures • Monitoring and adjusting production/process • Distinguishing between essential and non-essential practices • Implementing use of planning tools within work of teams • Monitoring implementation of 5S procedures in teams • Determining and prioritising required actions • Collecting, organising and analysing information from work activities • Monitoring work activities according to safety and workplace standards • Setting production targets and outcomes • Interpreting data and information as required by own job • Asking questions to ensure understanding of work requirements in teams and among other employees
Self-management	• Recommending methods of increasing own contribution to the value chain • Adjusting work processes according to procedures and customer requirements • Identifying and managing impact of change in own work • Minimising waste in own work activity • Assessing own work performance • Setting personal objectives for work performance • Managing own time
Learning	• Identifying skill requirements of self and team members • Arranging skill development training for self and others • Adapting to changing work requirements • Asking questions to aid learning of others • Identifying personal skill gaps and additional skills needs • Asking questions to ensure understanding of own work

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	requirements • Monitoring own work and identifying areas for improvement • Seeking feedback on work performance • Providing feedback on work performance to team leaders and team members
Technology	• Monitoring technology to ensure safety according to legislative requirements and workplace standards • Identifying equipment and processes appropriate for jobs and skill levels of employees • Providing appropriate equipment to ensure safety and efficiency according to skill levels of employees • Assessing operational efficiency of technology within own skill level and that of team members • Acting on reports of faulty operation of equipment • Analysing data and other information from equipment reports • Conducting failure mode effects analyses • Using information technology appropriate for job • Managing maintenance procedures appropriate to job and processes according to skill levels of team members

Packaging Rules

Packaging Rules

To be awarded the Diploma of Recreational Vehicles competency must be achieved in **ten** (**10**) units of competency:

- **three** (**3**) core units of competency
- **seven** (**7**) elective units of competency, as specified below:

  - a minimum of **two** (**2**) units of competency must be selected from Group A
  - the balance of units, to a maximum of **five** (**5**), may be selected from:
    - units not previously selected from Group A
    - Group B units listed below.

Note: Up to **two** (**2**) elective units of competency may be selected from this Training package, other endorsed Training Packages and accredited courses, as specified in Groups A and B.

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Note: Where prerequisite units are identified, they must be counted in the total number of units required for completion of the qualification.

Core units of competency

Unit code	Unit title	Prerequisites
MSAENV272B	Participate in environmentally sustainable work practices	
MSAPMOHS200A	Work safely	
MSAPMSUP210A	Process and record information	

Elective units of competency

Group A

Unit code	Unit title	Prerequisites
AURV365356A	Read and interpret vehicle body repair estimation/quotation	
AURVTN4032	Determine vehicle body damage and recommend repair procedures	
MEM09002B	Interpret technical drawing	
MEM09204A	Prepare basic engineering detail drawings	*
MEM09009C	Create 2D drawings using computer-aided design (CAD) system	*
MEM09210A	Create 3-D solid models using computer aided design system	*
MEM16008A	Interact with computing technology	
MEM16009A	Research and analyse engineering information	*
MEM16012A	Interpret technical specifications and manuals	

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Unit code	Unit title	Prerequisites
MEM30031A	Operate computer-aided design (CAD) system to produce basic drawing elements	
MSS405075A	Facilitate the development of a new product	*
Up to **one** (**1**) relevant elective unit of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses where that unit is available for inclusion at the Diploma level.		

Group B

Unit code	Unit title	Prerequisites
AUMFTA001	Document manufacturing design processes	
AURALA3001	Determine legal aspects of an automotive service and repair contract	
AURAMA5006	Contribute to business improvement	
AURAFA5007	Develop and document specifications and procedures	
AURTNA5001	Estimate and calculate costs to repair, maintain or modify a vehicle	
BSBFIM501A	Manage budgets and financial plans	
MEM11007B	Administer inventory procedures	
MEM11012B	Purchase materials	
MEM11017B	Organise and lead stocktakes	*
MEM14001B	Schedule material deliveries	
MEM15004B	Perform inspection	
MEM15005B	Select and control inspection processes and procedures	*
MEM16006A	Organise and communicate information	
MSS404052A	Apply statistics to operational processes	

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Unit code	Unit title	Prerequisites
MSS405041A	Implement improvement systems in an organisation	
MSS405081A	Develop a proactive maintenance strategy	
MSAENV472B	Implement and monitor environmentally sustainable work practices	
MSAPMSUP400A	Develop and monitor quality systems	
MSARVS301A	Develop and update caravan industry knowledge	
PSPGOV408A	Value diversity	
Up to **one** (**1**) relevant elective unit of competency may be selected from this Training Package, other endorsed Training Packages and accredited courses where that unit is available for inclusion at the Diploma level.		

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MSA60108 Advanced Diploma of Manufacturing Technology

Modification History

Release 5: unit codes corrected in Group B electives:

- MEM14091A Integrate manufacturing fundamentals into an engineering task
- MEM14092A Integrate maintenance fundamentals into an engineering task

Release 4 - MEM imported elective units replaced by current version. Equivalent.

Release 3 - MSACM units replaced by MSS units from MSS11v2 Sustainability Training Package.

Release 2 - Imported unit codes updated.

Description

This qualification is suitable for delivery part time over a four year period. There are two specialist streams available:

- Metallurgy
- Polymer Technology.

Each stream offers an opportunity for significant choice in electives and each stream requires the same core units to be completed.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

MSA60108 Advanced Diploma of Manufacturing Technology

The following table contains a summary of the Employability Skills as identified by the manufacturing technology related industries for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that reflect skill requirements for this level.

Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Communicate with members of supply chain • Use information and communication technology to interpret and analyse market and supply chain information and research new processes and products • Calculate costs • Use a range of communication and marketing tools to present concepts to a variety of audiences • Negotiate contracts with national and international networks • Complete documentation and maintain records
Teamwork	• Network with clients, industry professionals, supply chain personnel and all levels of internal management • Provide product information to others in the team
Problem-solving	• Interpret and evaluate market information for use in current and future practices • Determine cost effective supply of materials and resources through the supply chain • Analyse consumer behaviour to inform marketing processes and identify market opportunities • Calculate cost estimates • Map and establish supply chain processes • Evaluate designs and identify opportunities for improvement
Initiative and enterprise	• Secure new networks with industry professionals and clients • Implement new product development processes • Participate in product improvement processes • Implement sales and marketing plans
Planning and organising	• Undertake effective planning of own and others' work to achieve desired outcomes within agreed time-frames • Schedule meetings and correspondences with networks • Monitor quality processes and analyse outcomes • Plan and implement contingency plans to respond to incidents and problems

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EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• Coordinate quality assurance • Coordinate people and processes to achieve desired goals • Define roles and responsibilities of others
Self-management	• Manage work plans and priorities and define responsibilities • Manage client and industry relationships and networks • Manage data flows and record keeping • Monitor own work against industry standards
Learning	• Develop or adjust processes based on new information • Conduct research to increase knowledge of industry practices and opportunities • Develop contacts and networks to support work activity
Technology	• Use information and communication technology to acquire, manage and share data and maintain communication networks. • Use computer-aided design technology to develop new products

Packaging Rules

Packaging Rules

To be awarded an Advanced Diploma of Manufacturing Technology competency must be achieved in **thirty one** (**31**) units of competency:

- **six** (**6**) core units of competency
- **twenty five** (**25**) elective units of competency chosen as described below.

Core units

The following **six** (**6**) units must be chosen:

Unit code	**Unit title**
MEM16006A	Organise and communicate information
MEM16008A	Interact with computing technology
MEM23001A	Apply advanced mathematical techniques in a manufacturing, engineering or related environment

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Unit code	Unit title
MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment
MSS402051A	Apply quality standards
MSAENV272B	Participate in environmentally sustainable work practices

Prerequisites

Units marked with an asterisk have one or more prerequisite requirements. The prerequisites for these units are to be counted in the total number of units required in the elective group. Please refer to the individual units for details.

Elective units

Choose **twenty five (25)** units as specified below for each specialist stream.

Group A - specialist streams

Choose **twenty five** (**25**) elective units as specified to achieve a specialist stream.

Note:

- All units from each specialist stream are available in Group B as General Electives.
- Five elective units may also be chosen from other qualifications in this Training Package, other endorsed Training Packages and accredited courses, as specified below.
-

Metallurgy specialist stream

Select **twenty five** (**25**) elective units:

- a minimum of **fourteen** (**14**) from the list below
- the balance may be chosen from Group B

Note:

- at least six of the 14 metallurgy elective units must be coded MSATCM5---
- the unit *MSATCM406A Apply basic chemistry principles to metallurgy* must also be selected if it has not already been completed as part of a lower qualification

Unit code	Unit title	Prerequisites

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Unit code	Unit title	Prerequisites
MEM22001A	Perform engineering activities	
MEM22002A	Manage self in the engineering environment	*
MEM23004A	Apply technical mathematics	
MEM23063A	Select and test mechanical engineering materials	*
MEM23109A	Apply engineering mechanic principles	*
MEM24012C	Apply metallurgy principles	
MEM30007A	Select common engineering materials	
MSATCM401A	Prepare and examine metallographic samples	
MSATCM402A	Monitor and test sands, cores and moulds	
MSATCM403A	Evaluate mould design and gating	
MSATCM404A	Undertake and interpret results of chemical analysis on metal samples	
MSATCM405A	Determine and supervise heat treatment of metal	*
MSATCM406A	Apply basic chemistry principles to metallurgy	
MSATCM501A	Calculate and predict chemical outcomes in metallurgical situations	*
MSATCM502A	Identify and describe equipment for mineral and chemical processing plants	*
MSATCM503A	Recommend a refractory for an application	
MSATCM504A	Select metal forming process	*
MSATCM505A	Select metal joining process	*
MSATCM506A	Monitor blast furnace operations	*
MSATCM507A	Monitor primary steel making process	*
MSATCM508A	Monitor secondary steelmaking operations	*
MSATCM509A	Recommend ferrous and non ferrous metals or alloys for an application	*

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Unit code	Unit title	Prerequisites
MSATCM510A	Apply metallurgical principles and techniques in welding and other thermal processes	*
MSATCM511A	Apply metallurgy principles and practice to determine metal forming and shaping processes	
MSATCM512A	Apply metallurgy principles and practice to optimise furnace operation	
MSATCM513A	Plan and complete metallurgical projects	*
MSATCM514A	Select surface treatment methods for metallic components or products	
MSATCM515A	Analyse metallurgical failures of components and recommend preventative measures	*
MSATCM516A	Select non metallic materials for engineering applications manufacturing, engineering and structural	
MSATCM517A	Determine corrosion prevention strategies for metal and alloys	
MSATCM518A	Interpret complex binary phase diagrams	*

Polymer technology specialist stream

Select **twenty five** (**25**) elective units:

- a minimum of **ten** (**10**) from the two groups below
- the balance may be chosen from Group B

Polymer technology group 1

Choose at least one of the following units:

Unit code	Unit title	Prerequisites
PMBTECH601B	Develop a new product	*
PMBTECH602B	Develop a new die or tool	*

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Unit code	Unit title	Prerequisites
PMBTECH603B	Design structural/mechanical polymeric components	*

Polymer technology group 2

Choose up to nine of the following units:

Unit code	Unit title	Prerequisites
MSS405075A	Facilitate the development of a new product	*
PMAOPS550B	Develop a colour formulation	
PMAOPS600C	Modify plant	
PMBTECH501B	Analyse equipment performance	*
PMBTECH502B	Review and analyse production trials and specify re-trials	*
PMBTECH503B	Determine rheology and output of plastics materials from processing equipment	*
PMBTECH504B	Determine heat transfer loads for processing equipment	*
PMBTECH505B	Choose polymer materials for an application	*
PMBTECH506B	Analyse the design of products and tools	*
PMBTECH507B	Develop fibre composite products using cored laminate techniques	*
PMBTECH508A	Develop a new compound	
PMBTECH509A	Modify an existing product	
PMBTECH510A	Analyse failure in polymeric materials	

Group B - General electives

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The balance of units for each specialist stream may be chosen from this list as specified below:

Metallurgy specialist stream	Up to 11 units
Polymer technology specialist stream	Up to 15 units

Unit code	**Unit title**	**Prerequisites**
AUM4003A	Interpret customer requirements	
FDFOP2005A	Work in a socially diverse environment	
LMTGN4016A	Contribute to the development of products or processes	
LMTGN5004A	Manage installation and commissioning of equipment and systems	
MEM06003C	Carry out heat treatment	
MEM09002B	Interpret technical drawing	
MEM09204A	Produce basic engineering detail drawings	*
MEM09205A	Produce electrical schematic drawings	*
MEM09005B	Perform basic engineering detail drafting	*
MEM09157A	Represent mechanical engineering design drafting	
MEM09158A	Represent mechatronic engineering design drafting	
MEM09155A	Prepare mechanical models for computer-aided engineering (CAE)	*
MEM09156A	Prepare mechatronic models for computer-aided engineering (CAE)	*
MEM12003B	Perform precision mechanical measurement	
MEM12005B	Calibrate measuring equipment	*
MEM12022B	Program coordinate measuring machine (advanced)	

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Unit code	Unit title	Prerequisites
MEM12023A	Perform engineering measurements	
MEM12024A	Perform computations	
MEM12025A	Use graphical techniques and perform simple statistical computations	
MEM13002B	Undertake occupational health and safety activities in the workplace	
MEM13010A	Supervise occupational health and safety in an industrial work environment	*
MEM13013B	Work safely with ionising radiation	
MEM14001B	Schedule material deliveries	
MEM14002B	Undertake basic process planning	
MEM14003B	Undertake basic production scheduling	
MEM14005A	Plan a complete activity	
MEM14085A	Apply mechanical engineering analysis techniques	*
MEM14086A	Apply mechatronic engineering analysis techniques	*
MEM14087A	Apply manufactured product design techniques	*
MEM14088A	Apply maintenance engineering techniques to equipment and component repairs and modifications	*
MEM14089A	Integrate mechanical fundamentals into an engineering task	*
MEM14090A	Integrate mechatronic fundamentals into an engineering task	*
MEM14091A	Integrate manufacturing fundamentals into an engineering task	*
MEM14092A	Integrate maintenance fundamentals into an engineering task	*

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Unit code	Unit title	Prerequisites
MEM15001B	Perform basic statistical quality control	
MEM15004B	Perform inspection	
MEM15005B	Select and control inspection processes and procedures	*
MEM15007B	Conduct product and/or process capability studies	*
MEM15008B	Perform advanced statistical quality control	*
MEM15010B	Perform laboratory procedures	
MEM15011B	Exercise external quality assurance	*
MEM15012B	Maintain/supervise application of quality procedures	*
MEM16010A	Write reports	*
MEM18001C	Use hand tools	
MEM18002B	Use power tools/hand held operations	
MEM18003C	Use tools for precision work	
MEM18006C	Repair and fit engineering components	
MEM18010C	Perform equipment condition monitoring and recording	
MEM18016B	Analyse plant/equipment condition monitoring results	*
MEM18055B	Dismantle, replace and assemble engineering components	
MEM22002A	Manage self in the engineering environment	*
MEM22012A	Coordinate resources for an engineering project or operation	
MEM22013A	Coordinate engineering projects	
MEM22014A	Coordinate engineering-related manufacturing operations	*

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Unit code	Unit title	Prerequisites
MEM22015A	Source and estimate engineering materials requirements	
MEM22007A	Manage environmental effects of engineering activities	*
MEM22017A	Coordinate continuous improvement and technical development in an engineering-related project or operation	
MEM22018A	Coordinate sales and promotion of engineering-related products or services	
MEM23007A	Apply calculus to engineering tasks	*
MEM23003A	Operate and program computers and/or controllers in engineering situations	*
MEM23004A	Apply technical mathematics	
MEM23006A	Apply fluid and thermodynamics principles in engineering	*
MEM23041A	Apply basic scientific principles and techniques in mechanical engineering situations	*
MEM23109A	Apply engineering mechanics principles	*
MEM23111A	Select electrical equipment and components for engineering applications	*
MEM23112A	Investigate electrical and electronic controllers in engineering applications	
MEM23063A	Select and test mechanical engineering materials	*
MEM23064A	Select and test mechatronic engineering materials	*
MEM23113A	Evaluate hydrodynamic systems and system components	*
MEM23114A	Evaluate thermodynamic systems and components	*
MEM23115A	Evaluate fluid power systems	*
MEM23116A	Evaluate programmable logic controller and	*

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Unit code	Unit title	Prerequisites
	related control system component applications	
MEM23117A	Evaluate microcontroller applications	*
MEM23118A	Apply production and service control techniques	*
MEM23119A	Evaluate continuous improvement processes	*
MEM23120A	Select mechanical machine and equipment components	*
MEM23121A	Analyse loads on frames and mechanisms	*
MEM23122A	Evaluate computer integrated manufacturing systems	*
MEM23123A	Evaluate manufacturing processes	
MEM23124A	Measure and analyse noise and vibration	*
MEM23125A	Evaluate maintenance systems	
MEM24002B	Perform penetrant testing	*
MEM24003B	Perform basic magnetic particle testing	*
MEM24004B	Perform magnetic particle testing	*
MEM24005B	Perform basic eddy current testing	*
MEM24006B	Perform eddy current testing	*
MEM24007B	Perform ultrasonic thickness testing	*
MEM24008B	Perform ultrasonic testing	*
MEM24009B	Perform basic radiographic testing	*
MEM24010B	Perform radiographic testing	*
MEM24011B	Establish non destructive tests	*
MEM30031A	Operate computer-aided design (CAD) system to produce basic drawing elements	
MEM30032A	Produce basic engineering drawings	

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Unit code	Unit title	Prerequisites
MEM30033A	Use computer-aided design (CAD) to create and display 3-D models	*
MEM30005A	Calculate force systems within simple beam structures	*
MEM30006A	Calculate stresses in simple structures	*
MEM30007A	Select common engineering materials	*
MEM30008A	Apply basic economic and ergonomic concepts to evaluate engineering applications	
MEM30009A	Contribute to the design of basic mechanical systems	*
MEM30012A	Apply mathematical techniques in a manufacturing engineering or related environment	
MEM30013A	Assist in the preparation of a basic workplace layout	
MEM30014A	Apply basic just in time systems to the reduction of waste	
MEM30015A	Develop recommendations for basic set up time improvements	
MEM30016A	Assist in the analysis of a supply chain	
MEM30017A	Use basic preventative maintenance techniques and tools	
MEM30018A	Undertake basic process planning	
MEM30019A	Use resource planning software systems in manufacturing	*
MEM30020A	Develop and manage a plan for a simple manufacturing related project	
MEM30021A	Prepare a simple production schedule	
MEM30022A	Undertake supervised procurement activities	
MEM30023A	Prepare a simple cost estimate for a manufactured	

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Unit code	Unit title	Prerequisites
	product	
MEM30024A	Participate in quality assurance techniques	*
MEM30027A	Prepare basic programs for programmable logic controllers	
MEM30028A	Assist in sales of technical products/systems	
MSS015002A	Develop strategies for more sustainable use of resources	
MSS402001A	Develop competitive systems and practices	
MSS402030A	Apply cost factors to work practices	
MSS402060A	Use planning software systems in operations	
MSS402061A	Use SCADA systems in operations	
MSS402080A	Undertake root cause analysis	
MSS403002A	Ensure process improvements are sustained	
MSS403010A	Facilitate change in an organisation implementing competitive systems and practices	
MSS403030A	Improve cost factors in work practices	
MSS403040A	Facilitate and improve implementation of 5S	
MSS403051A	Mistake proof a production process	
MSS404050A	Undertake process capability improvements	*
MSS404052A	Apply statistics to operational processes	
MSS404081A	Undertake proactive maintenance analyses	
MSS404082A	Assist in implementing a proactive maintenance strategy	
MSS405002A	Analyse and map a value stream	
MSS405003A	Manage a value stream	

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Unit code	Unit title	Prerequisites
MSS405004A	Develop business plans in an organisation implementing competitive systems and practices	
MSS405005A	Manage competitive systems and processes responding to individual and unique customer requirements	
MSS405010A	Manage relationships with non-customer external organisations	
MSS405011A	Manage people relationships	
MSS405012A	Manage workplace learning	
MSS405020A	Develop quick changeover procedures	
MSS405021A	Develop a Just in Time system	
MSS405022A	Design a process layout	
MSS405023A	Develop a levelled pull system for operations and processes	
MSS405030A	Optimise cost of product or service	
MSS405031A	Undertake value analysis of product costs in terms of customer requirements	
MSS405040A	Manage 5S system in an organisation	
MSS405050A	Determine and improve process capability	*
MSS405052A	Design an experiment	*
MSS405060A	Develop the application of enterprise control systems in an organisation	
MSS405061A	Determine and establish information collection requirements and processes	
MSS405070A	Develop and manage sustainable energy practices	
MSS405075A	Facilitate the development of a new product	*
MSS405081A	Develop a proactive maintenance strategy	

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Unit code	Unit title	Prerequisites
MSS405083A	Adapt a proactive maintenance strategy for a seasonal or cyclical business	*
MSAENV472B	Implement and monitor environmentally sustainable work practices	
MSAENV672B	Develop workplace policy and procedures for environmental sustainability	
MSAPMOHS300A	Facilitate the implementation of OHS for a work group	
MSAPMOHS400A	Contribute to workplace OHS management system	
MSAPMOHS401A	Assess risk	
MSAPMOHS510A	Manage risk	
MSAPMOPS400A	Optimise process/plant area	
MSAPMOPS401A	Trial new process or product	
MSAPMOPS601A	Design equipment and system modifications	
MSAPMSUP303A	Identify equipment faults	
MSAPMSUP390A	Use structured problem solving tools	
MSATCM301A	Test the mechanical properties of materials	
MSATCM302A	Monitor basic ferrous melting and casting processes	
MSATCM303A	Monitor basic non-ferrous melting and casting processes	
MSATCM304A	Interpret basic binary phase diagrams	
MSATCM305A	Demonstrate basic knowledge of casting operations	
MSL973001A	Perform basic tests	
MSL973006A	Prepare trial batches for evaluation	
MSL973007A	Perform microscopic examination	

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Unit code	Unit title	Prerequisites
MSL974001A	Prepare, standardise and use solutions	
MSL974003A	Perform chemical tests and procedures	
MSL974005A	Perform physical tests	
MSL974010A	Perform mechanical tests	
MSL975016A	Perform complex tests to measure engineering properties of materials	
PMAOHS310B	Investigate incidents	
PMAOPS350B	Match and adjust colour	
PMAOPS450B	Solve colour problems	
PMAOPS550B	Develop a colour formulation	*
PMASUP420B	Minimise environmental impact of process	
PMASUP520B	Review procedures to minimise environmental impact of processes	
PMASUP540B	Analyse equipment performance	
PMBPREP304C	Set a die	
PMBPREP305B	Change extrusion die and calibration setup	
PMBPROD235C	Use materials and process knowledge to complete work operations	
PMBPROD430B	Trial a new die/tool	
PMBPROD431B	Trial a new, advanced or complex mould	
PMBTECH301B	Use material and process knowledge to solve problems	*
PMBTECH302A	Modify existing compounds	
PMBTECH303A	Make minor modifications to products	
PMBTECH401B	Predict polymer properties and characteristics	*

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Unit code	Unit title	Prerequisites
PMBTECH402B	Set up and remove complex dies	*
PMBTECH406A	Diagnose production equipment problems	
PMBTECH501B	Analyse equipment performance	*
PMBTECH502B	Review and analyse production trials and specify re-trials	*
PMBTECH503B	Determine rheology and output of plastics materials from processing equipment	*
PMBTECH504B	Determine heat transfer loads for processing equipment	*
PMBTECH505B	Choose polymer materials for an application	
PMBTECH506B	Analyse the design of products and tools	*
PMBTECH507B	Develop fibre composite products using cored laminate techniques	
PMBTECH508A	Develop a new compound	*
PMBTECH509A	Modify an existing product	
PMBTECH510A	Analyse failure in polymeric materials	

A maximum of **five** (**5**) units can be selected from this Training Package, other endorsed Training Packages and accredited courses where those units are available for inclusion at Diploma or Advanced Diploma level.

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MSASS00001 Confined space work team

Modification History

Not applicable.

Description

Not applicable.

Pathways Information

Pathway

These units of competency can provide credit towards Certificates II and III in PMA08 Chemical, Hydrocarbons&Refining Training Package.

Licensing/Regulatory Information

Not applicable.

Skill Set Requirements

Units

MSAPMOHS200A Work safely

MSAPMPER200C Work in accordance with an issued permit

MSAPMPER202A Observe permit work

MSAPMPER205C Enter confined space

Target Group

Target group

Persons entering a confined space must do so in accordance with the relevant Australian Standard. Where members of a work team are expected to undertake multiple roles in regard to the confined space entry, then they must be competent in all those roles. This skills set is targeted at such a work team. This training would occur before starting work requiring entry to a confined space. This may occur either as part of safety training to work on the site or more commonly as separate training after initial safety induction.

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Suggested words for Statement of Attainment

Suggested words for Statement of Attainment

These competencies from MSA07 Manufacturing Training Package meet the minimum industry requirements for members of a confined space work team.

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MSASS00002 High pressure water jetting assistant

Modification History

Not applicable.

Description

Not applicable.

Pathways Information

Pathway

These competencies can provide credit towards relevant qualifications in the MSA07 Manufacturing and MEM05 Metal and Engineering Training Packages

Licensing/Regulatory Information

Not applicable.

Skill Set Requirements

Units

MSAPMWJ201A Use high pressure water jetting equipment

MSAPMOHS110A Follow emergency response procedures

MSAPMOHS200A Work safely

MSAPMPER200C Work in accordance with an issued permit

Target Group

Target group

Members of the water jetting team who are not competent to operate independently need to have basic competencies before working under supervision. This not only involves technical competence in high pressure water jetting but also requires safe operation within the worksite which may not be familiar to the operator.

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Suggested words for Statement of Attainment

Suggested words for Statement of Attainment

These competencies from the MSA07 Manufacturing and other Training Packages meet the minimum industry requirements for a high pressure water jetting assistant.

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MSASS00003 High pressure water jetting operator

Modification History

Not applicable.

Description

Not applicable.

Pathways Information

Pathway

These competencies can provide credit towards relevant qualifications in the MSA07 Manufacturing and MEM05 Metal and Engineering Training Packages

Licensing/Regulatory Information

Not applicable.

Skill Set Requirements

Units

MSAPMWJ301A Operate a high pressure water jetting system

MEM09002B Interpret technical drawing

MSAPMOHS110A Follow emergency response procedures

MSAPMOHS200A Work safely

MSAPMPER200C Work in accordance with an issued permit

Target Group

Target group

At least one member of the water jetting team needs to be competent to operate independently. This not only involves technical competence in high pressure water jetting but also requires safe operation within the worksite which may not be familiar to the operator.

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Suggested words for Statement of Attainment

Suggested words for Statement of Attainment

These competencies from the MSA07 Manufacturing and other Training Packages meet the minimum industry requirements for an independent high pressure water jetting operator.

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MSASS00004 Leading Hand/Supervisor

Modification History

Release 3 - MSACM unit updated in unit grid. No change to outcomes.

Release 2 - MSACM unit replaced by MSS unit from MSS11v2 Sustainability Training Package.

Description

The Skill Set below has been developed in consultation with the industry and is based on a logical cluster of units which meet critical industry needs in the area of supervision and safety. The Skill Set consists of a cluster of competencies which are commonly practiced (and possibly trained) together. It reflects an industry need to be able to recognise that a person can undertake this defined role.

Pathways Information

These competencies can provide credit towards relevant qualifications in all MSA training packages.

Licensing/Regulatory Information

Not applicable.

Skill Set Requirements

Units:

MSAPMOPS212A	Use enterprise computer or data systems
MSAPMOHS300A	Facilitate the implementation of OHS for a work group
MSS403011A	Facilitate implementation of competitive systems and practices
TAEDEL301A	Provide work skill instruction

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Target Group

Entrants to the Leading Hand/Supervisor Skill Set will be required to have completed a Certificate III qualification in a manufacturing related area, or equivalent. This Skill Set addresses the need for coordination and supervision of trainees, apprentices and other production staff to ensure work place safety, quality and production requirements are maintained and monitored.

Suggested words for Statement of Attainment

These competencies from the MSA07 Manufacturing and other Training Packages meet the minimum industry requirements for supervision of staff working in a manufacturing environment

Custom Content Section

Not applicable.

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MSASS00005 License to operate a standard boiler

Modification History

Release 1 - New Skill Set

Description

Not applicable.

Pathways Information

This Skill Set can be a stand-alone licensing outcome or the unit it comprises credited in any qualification where it is included as core or an elective option.

Licensing/Regulatory Information

Meets national High Risk Work Licensing for standard boiler operation

Skill Set Requirements

MSABLIC001 Licence to operate a standard boiler

Target Group

The target group is boiler operators operating standard boilers that require occupational licensing by a State and Territory OHS regulator.

Suggested words for Statement of Attainment

This unit of competency meets the minimum industry requirements for high risk work licensing of standard boiler operation.

Custom Content Section

Not applicable.

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MSASS00006 License to operate an advanced boiler

Modification History

Release 1 - New Skill Set

Description

Not applicable.

Pathways Information

This Skill Set can be a stand-alone licensing outcome or the unit it comprises credited in any qualification where it is included as core or an elective option.

Licensing/Regulatory Information

Meets national High Risk Work Licensing for advanced boiler operation

Skill Set Requirements

MSABLIC002 Licence to operate an advanced boiler

Target Group

The target group is boiler operators operating advanced boilers that require occupational licensing by a State and Territory OHS regulator.

Suggested words for Statement of Attainment

This unit of competency meets the minimum industry requirements for high risk work licensing of advanced boiler operation.

Custom Content Section

Not applicable.

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MSASS00007 Trade Measurement Verification (Complex Measuring Instrument)

Modification History

Not applicable.

Description

Not applicable.

Pathways Information

Pathway

These competencies can provide credit towards qualifications within the Manufacturing Training Package. If verifiers seek employment as trade measurement inspectors, these competencies may provide recognition towards the new Diploma of Government (Trade Measurement).

Licensing/Regulatory Information

Not applicable.

Skill Set Requirements

Units

- MSATMVER501A Verify a complex measuring instrument
- MSATMREF301A Use and maintain reference standards.
-

Target Group

Target group

This Skill Set is appropriate for experienced personnel such as fitters, mechanics, instrument manufacturers or importers and software developers who wish to work under a servicing licence to verify complex measuring instruments used in trade measurement. Examples of complex measuring instruments include, LPG dispensers, LPG bulk flowmetering systems, flowmetering systems tested using master meter or gravimetric methods, automatic rail weighbridges, continuous totalising automatic weighing instruments (belt weighers) and totalising hopper weighing instruments.

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This Skill Set reflects the minimum requirements for licensing. However, the regulator or individual traders may impose additional requirements before a verifier can start work on some sites. Entrants to this Skill Set should have sufficient workplace skills in OH&S, communication and teamwork that provide underpinning competency to acquire and apply the Skill Set.

Suggested words for Statement of Attainment

Suggested words for Statement of Attainment

These competencies are taken from the Manufacturing Training Package and provide training that meets the minimum requirements for licensing as a verifier of a complex measuring instrument.

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MSASS00008 Trade Measurement Verification (Limited Weighing Instrument)

Modification History

Not applicable.

Description

Not applicable.

Pathways Information

Pathway

These competencies can provide credit towards qualifications within the Manufacturing Training Package. If verifiers seek employment as trade measurement inspectors, these competencies may provide recognition towards the new Certificate IV in Government (Trade Measurement).

Licensing/Regulatory Information

Not applicable.

Skill Set Requirements

Units

- MSATMVER401A Verify a limited weighing instrument
- MSATMREF301A Use and maintain reference standards.
-

Target Group

Target group

This Skill Set is appropriate for experienced personnel such as fitters, mechanics, instrument manufacturers or importers and software developers who wish to work under a servicing licence to verify limited weighing instruments used in trade measurement. Examples of limited weighing instruments include, non-automatic weighing machines tested without substitution loads, automatic Class Y(a) Catchweighers and automatic Class Y(b) Catchweighers.

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This Skill Set reflects the minimum requirements for licensing. However, the regulator or individual traders may impose additional requirements before a verifier can start work on some sites. Entrants to this Skill Set should have sufficient workplace skills in OH&S, communication and teamwork that provide underpinning competency to acquire and apply the Skill Set.

Suggested words for Statement of Attainment

Suggested words for Statement of Attainment

These competencies are taken from the Manufacturing Training Package and provide training that meets the minimum requirements for licensing as a verifier of a limited weighing instrument.

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MSASS00009 Trade Measurement Verification (Liquid Measuring Instrument Using Volume Measures)

Modification History

Not applicable.

Description

Not applicable.

Pathways Information

Pathway

These competencies can provide credit towards qualifications within the Manufacturing Training Package. If verifiers seek employment as trade measurement inspectors, these competencies may provide recognition towards the new Certificate IV in Government (Trade Measurement).

Licensing/Regulatory Information

Not applicable.

Skill Set Requirements

Units

- MSATMVER402A Verify a liquid measuring instrument using volume measures
- MSATMREF301A Use and maintain reference standards.
-

Target Group

Target group

This Skill Set is appropriate for experienced personnel such as fitters, mechanics, instrument manufacturers or importers and software developers who wish to work under a servicing licence to verify liquid measuring instruments used in trade measurement. Examples of liquid measuring instruments using volume measures include, fuel dispensers other than LPG dispensers, bulk flowmetering systems for liquid hydrocarbons other than LPG and milk flowmeters.

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This Skill Set reflects the minimum requirements for licensing. However, the regulator or individual traders may impose additional requirements before a verifier can start work on some sites. Entrants to this Skill Set should have sufficient workplace skills in OH&S, communication and teamwork that provide underpinning competency to acquire and apply the Skill Set.

Suggested words for Statement of Attainment

Suggested words for Statement of Attainment

These competencies are taken from the Manufacturing Training Package and provide training that meets the minimum requirements for licensing as a verifier of a liquid measuring instrument using volume measures.

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MSASS00010 Trade Measurement Verification (Simple Measuring Instrument)

Modification History

Not applicable.

Description

Not applicable.

Pathways Information

Pathway

These competencies can provide credit towards qualifications within the Manufacturing Training Package. If verifiers seek employment as trade measurement inspectors, these competencies may provide recognition towards the Certificate IV in Government (Trade Measurement).

Licensing/Regulatory Information

Not applicable.

Skill Set Requirements

Units

- MSATMVER302A Verify a simple measuring instrument
- MSATMREF301A Use and maintain reference standards.
-

Target Group

Target group

This Skill Set is appropriate for experienced personnel such as quality assurance technicians, instrument manufacturers or importers and software developers who wish to work under a servicing licence to verify simple measuring instruments used in trade measurement. Examples of simple measuring instruments include, beverage measuring instruments, protein measuring instruments, length measuring instruments, area measuring instruments' dimensional measuring instruments, vehicle tanks and milk tanks.

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This Skill Set reflects the minimum requirements for licensing. However, the regulator or individual traders may impose additional requirements before a verifier can start work on some sites. Entrants to this Skill Set should have sufficient workplace skills in OH&S, communication and teamwork that provide underpinning competency to acquire and apply the Skill Set.

Suggested words for Statement of Attainment

Suggested words for Statement of Attainment

These competencies are taken from the Manufacturing Training Package and provide training that meets the minimum requirements for licensing as a verifier of a simple measuring instrument.

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AUMANA001 Prepare and document quotations

Modification History

Release	Comment
Release 1	Unit updated to reflect the new standards for Training Packages Replaces AUMANA3001 Prepare and document quotation

Application

This unit describes the performance outcomes required to determine job requirements and produce a quotation for a customer.

It applies to those in an automotive environment.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Competency Field

Manufacturing - Common

Unit Sector

Loss Assessment or Repair Quoting

Elements and Performance Criteria

Elements Elements describe the essential outcomes	**Performance Criteria** Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the range of conditions section
1. Determine customer requirements	1.1 Customer requirements are established and job parameters specified according to workplace procedures 1.2 Customer requirements are compared with existing workplace products and services 1.3 Variations required by the customer are established
2. Estimate the job	2.1 Variations from standard workplace product or service are identified and estimated

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Elements	Performance Criteria
	2.2 Additional processes, parts and skills required to meet customer requirements are estimated 2.3 Workplace job costing procedures, including ***cost-reduction initiatives***, are used to estimate materials, parts, labour and equipment costs for the job 2.4 Estimates for contingencies and changed work requirements are included in the total job cost
3. Document and confirm quotation	3.1 Quotation is prepared and confirmed with client according to workplace procedures 3.2 Customer purchase and payment arrangements are negotiated 3.3 Changes and variations are negotiated to meet customer and workplace needs 3.4 Workplace record and customer file are processed according to workplace procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Skills	Description
Reading skills to:	• identify job and customer requirements • interpret workplace procedures and specifications relating to quotation.
Writing skills to:	• produce job requirements and material lists • legibly complete quotation, associated workplace records and customer file.
Oral communication skills to:	• communicate and negotiate with customers.
Numeracy skills to:	• identify customer specifications • determine job budget including, materials, parts, labour and equipment costs • estimate contingencies and changed work requirements • produce a quotation that has mathematical information legibly embedded.
Planning and organising skills to:	• determine order and timing of processes.
Problem-solving skills to:	• determine process needed to fulfil customer product or service

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Skills	Description
	requirements.

Range of Conditions

This section specifies work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Bold italicised wording, if used in the performance criteria, is detailed below.

Cost-reduction initiatives must include:	• continuous improvement programs • waste avoidance.

Unit Mapping Information

No equivalent unit.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bd587669-08b3-4cd5-85f0-f9fa0c6304c1

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Assessment Requirements for AUMANA001 Prepare and document quotations

Modification History

Release	Comment
Release 1	Unit updated to reflect the new standards for Training Packages Replaces AUMANA3001 Prepare and document quotation

Performance Evidence

Before competency can be determined, individuals must have competently prepared and documented a quotation on a minimum of three occasions.

Individuals must demonstrate they can:

- prepare a detailed estimate of job labour, parts, equipment and materials based on customer requirements
- accurately estimate the job, allowing for contingencies
- prepare a detailed, legible quotation document
- follow workplace procedures when preparing and processing the quotation.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- procedures for determining and negotiating customer requirements in order to prepare a quotation
- procedures for planning and estimating a job, including:
  - methods of determining labour rates and job time length
  - methods of determining job processes and material requirements
  - methods of planning for contingencies
- cost minimisation and waste avoidance procedures and practices
- workplace quotation flow chart.

Assessment Conditions

Assessors must satisfy SNR/AQTF assessor requirements.

Competency is to be assessed in the workplace or a simulated environment that accurately reflects performance in a real workplace setting.

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Where assessment of competency includes third-party evidence, individuals must provide evidence that links them to quotations they have prepared.

Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application.

The following resources must be made available:

- automotive manufacturing workplace or simulated workplace
- real or simulated customer product or service requiring a quotation
- workplace documentation for estimating and preparing a quotation
- workplace procedures for preparing and processing a quotation.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bd587669-08b3-4cd5-85f0-f9fa0c6304c1

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bd587669-08b3-4cd5-85f0-f9fa0c6304c1

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AUMFTA001 Document manufacturing design processes

Modification History

Release	Comment
Release 1	Unit updated to reflect the new standards for Training Packages Replaces AUMFTA3001 Document designs

Application

This unit describes the performance outcomes required to document the design details of the production processes of vehicles and their components.

It applies to those in an automotive and related manufacturing environment and involves the application of skills and knowledge at a specialist level.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Competency Field

Manufacturing - Passenger Vehicle

Unit Sector

Technical

Elements and Performance Criteria

Elements Elements describe the essential outcomes	**Performance Criteria** Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the range of conditions section
1. Identify document needs	1.1 Design brief and ***requirements*** are identified and confirmed with appropriate personnel 1.2 Production processes, drawings, technical specifications and instructions are identified and clarified with participating personnel

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Elements	Performance Criteria
2. Develop draft documents	2.1 Draft ***documents*** relating to the specification, costing, manufacture and assembly of products are prepared according to workplace procedures 2.2 Draft document content is confirmed with relevant personnel and their feedback integrated as appropriate
3. Finalise documentation process	3.1 Approved documents are communicated to relevant production, management and engineering personnel 3.2 Documents are distributed and stored according to workplace procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Skills	Description
Reading skills to:	• interpret production and work area requirements • interpret workplace procedures and product specifications • interpret design brief.
Writing skills to:	• legibly complete design documents.
Oral communication skills to:	• communicate and negotiate with workplace personnel on document design and content.
Numeracy skills to:	• quantify workplace document needs • determine document budget, materials and resources • produce a document with mathematical information.
Digital literacy skills to:	• use workplace computer programs and design applications.
Initiative skills to:	• adapt to document design requirements.
Planning and organising skills to:	• manage document research, design and development time.
Problem-solving skills to:	• identify problems, particularly in production, to meet performance indicators • access, interpret and apply workplace procedures and instructions to ensure documents meet workplace template requirements and standards.
Teamwork skills to:	• work in a design consultation process.

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Range of Conditions

This section specifies work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Bold italicised wording, if used in the performance criteria, is detailed below.

Requirements must include:	• design quality • materials • production processes • testing and costing.
Documents must include:	• budgets • material requirements • production processes • resources • specified parameters • test requirements • timelines.

Unit Mapping Information

No equivalent unit.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bd587669-08b3-4cd5-85f0-f9fa0c6304c1

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Assessment Requirements for AUMFTA001 Document manufacturing design processes

Modification History

Release	Comment
Release 1	Unit updated to reflect the new standards for Training Packages Replaces AUMFTA3001 Document designs

Performance Evidence

Before competency can be determined, individuals must have competently developed and designed workplace documents on a minimum of two occasions.

Individuals must demonstrate they can:

- comply with workplace procedures when designing production documents
- apply working knowledge of production practices and systems
- identify design requirements
- communicate with internal personnel to seek their input into and approval of documents
- design and modify documents
- incorporate design quality, materials, production processes, testing and costing into document design process
- complete, disseminate and store design documents.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- workplace documents covering procedures, specifications, schedules, quality instructions, procedures and performance indicators
- workplace communication protocols for developing and disseminating design documentation
- processes to identify design requirements
- processes to identify critical product quality, materials, tests and costing
- processes for developing and storing documents.

Assessment Conditions

Assessors must satisfy SNR/AQTF assessor requirements.

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Competency is to be assessed in the workplace or a simulated environment that accurately reflects performance in a real workplace setting.

Where assessment of competency includes third-party evidence, individuals must provide evidence that links them to the automotive production documents that they have designed, e.g. a copy of the production documents.

Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application.

The following resources must be made available:

- automotive manufacturing workplace or simulated workplace
- real or simulated automotive production document requirements
- automotive production document design brief and development instructions
- computer system and design software
- workplace procedures relating to the design of automotive production documents.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bd587669-08b3-4cd5-85f0-f9fa0c6304c1

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bd587669-08b3-4cd5-85f0-f9fa0c6304c1

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AUMGTT001 Apply trim to vehicle components

Modification History

Release	Comment
Release 1	Unit updated to reflect the new standards for Training Packages Replaces AUMGTT2001 Apply trim to components

Application

This unit describes the performance outcomes required to measure, cut and attach trim materials to vehicle components.

It applies to those in an automotive manufacturing environment and involves the application of skills and knowledge at a production worker level.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Competency Field

Manufacturing - Bus, Truck and Trailer

Unit Sector

Technical - Trimming and Upholstery

Elements and Performance Criteria

Elements Elements describe the essential outcomes	**Performance Criteria** Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the range of conditions section
1. Plan and prepare	1.1 Work orders, job specifications and working drawings are identified, interpreted and confirmed 1.2 Trim materials, tools and equipment are selected and inspected, and faults repaired or reported
2. Match materials	2.1 Trim materials are matched, measured and cut according to job specifications and workplace procedures

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Elements	Performance Criteria
	2.2 Material characteristics are identified and selected for use 2.3 Attaching or bonding information is identified and interpreted from ***appropriate sources***
3. Attach materials	3.1 ***Workplace procedures*** are identified and followed 3.2 Trim materials are pre-fitted and checked for alignment, appearance and quality according to job specifications 3.3 Trim materials are attached to components by approved methods
4. Complete work processes	4.1 Tools and equipment are cleaned, inspected and stored according to workplace procedures 4.2 Faulty equipment is identified, reported and tagged 4.3 Work areas are cleaned, and unused materials stored 4.4 Waste materials are removed and disposed of or recycled according to workplace environmental procedures 4.5 Work sheets are completed according to workplace procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Skills	Description
Reading skills to:	• interpret work health and safety (WHS) requirements and workplace procedures • interpret machine safe operating procedures • interpret job specifications, work orders and working drawings.
Writing skills to:	• complete work sheets and job schedules • prepare work plans and inspection reports • complete machine maintenance forms • complete faulty equipment tags • complete job consumable lists.
Oral communication skills to:	• confirm work orders and job specifications with appropriate personnel • report faults with materials, tools and equipment.
Numeracy skills to:	• calculate material length, width and height • calculate measurements from working drawings • mark out materials

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	• set trimming machine settings • use measuring equipment • identify common 2D and 3D trim shapes.
Initiative skills to:	• adapt to changing work conditions.
Planning and organising skills to:	• interpret and apply information on job requirements, quality and workplace procedures • plan work from work orders.
Self-management skills to:	• take responsibility for organising own work.
Problem-solving skills to:	• access, interpret and apply information on workplace procedures and instructions.
Teamwork skills to:	• solve problems particularly in teams in order to meet job outcomes.

Range of Conditions

This section specifies work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Bold italicised wording, if used in the performance criteria, is detailed below.

Appropriate sources must include:	• customer requirements • material and product specifications.
Workplace procedures must include:	• procedures for recording and reporting the application of trim to vehicle components • use of tools and equipment for applying trim to vehicle components • WHS requirements for applying trim to vehicle components • workplace quality standards relevant to applying trim to vehicle components.

Unit Mapping Information

No equivalent unit.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bd587669-08b3-4cd5-85f0-f9fa0c6304c1

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Assessment Requirements for AUMGTT001 Apply trim to vehicle components

Modification History

Release	Comment
Release 1	Unit updated to reflect the new standards for Training Packages Replaces AUMGTT2001 Apply trim to components

Performance Evidence

Before competency can be determined, individuals must have competently applied trim to vehicle components on a minimum of three occasions.

Individuals must demonstrate they can:

- locate, interpret and apply work information and specifications relating to applying trim to vehicle components
- use trimming, bonding and attaching equipment safely
- cut covers and trim to job specifications
- select appropriate bonding and attaching processes for applying trim to vehicle components
- attach trim to vehicle components according to workplace procedures and work health and safety (WHS) requirements
- complete work sheets relating to applying trim to vehicle components.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- WHS requirements relevant to applying trim to vehicle components
- procedures for trim matching, measuring and calculating required trim dimensions
- trim cutting procedures
- trim application and removal methods
- trim adjustment methods
- types and use of materials and equipment relevant to applying trim to vehicle components, including:
  - glues
  - rivets
  - trim cutting equipment
  - trim forming equipment

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  - trim stapling equipment
- sewing procedures of vehicle trim.

Assessment Conditions

Assessors must satisfy SNR/AQTF assessor requirements.

Competency is to be assessed in the workplace or a simulated environment that accurately reflects performance in a real workplace setting.

Where assessment of competency includes third-party evidence, individuals must provide evidence that links them to the vehicle components to which they have applied trim, e.g. production work sheets.

Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application.

The following resources must be made available:

- automotive manufacturing workplace or simulated workplace
- trim application work sheets, instructions and job specifications
- vehicle trimming materials, equipment and consumables
- vehicle components that require trimming
- personal protective equipment (PPE) relevant to applying trim to vehicle components.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bd587669-08b3-4cd5-85f0-f9fa0c6304c1

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=bd587669-08b3-4cd5-85f0-f9fa0c6304c1

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FPICOT2238A Cut materials with a hand-held chainsaw

Modification History

Release 2

Release 2 created to reflect that FPICOT2238A supersedes both FPICOT2206A and FPICOT2206B. Equivalent

Unit Descriptor

Unit descriptor

This unit describes the outcomes required to prepare and cut materials with a hand-held chainsaw. This unit includes basic operator maintenance checks

More comprehensive servicing and maintenance procedures are covered in FPICOT2237A Maintain chainsaws

General legislative, regulatory and workplace requirements apply to this unit; however there are no specific licensing or certification requirements at the time of publication

This unit replaces FPICOT2206B Cross cut materials with an hand-held chainsaw

Application of the Unit

Application of the unit

The unit involves cutting materials with a hand-held chainsaw in a variety of work settings including a construction, saw mill, forest products factory, timber retail yard or horticultural environment

The skills and knowledge required for competent performance are to be used within the scope of the person's job and authority

Licensing/Regulatory Information

Refer to Unit Descriptor

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Pre-Requisites

Not Applicable

Employability Skills Information

Employability skills This unit contains employability skills

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for operation	1.1. Applicable ***Occupational Health and Safety*** (***OHS***), environmental, ***legislative***, ***organisational requirements*** and manufacturer's specifications relevant to cutting ***materials*** with a hand-held chainsaw are identified and followed 1.2. ***Job requirements*** are reviewed and clarified with ***appropriate personnel*** 1.3. ***Tools and equipment*** are selected appropriate to job requirements and checked for operational effectiveness in line with manufacturer's recommendations and site procedures 1.4. Tasks are identified and planned in line with job requirements 1.5. ***Communication*** with others is established and maintained in line with OHS requirements and site procedures 1.6. Requirements for recycling or disposal of waste material are identified

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ELEMENT	PERFORMANCE CRITERIA
2. Cut material	2.1. Work area is prepared, checked and ***cleared*** in line with OHS requirements and site procedures
	2.2. ***Supports*** are placed as required to ensure a stable base
	2.3. Material is visually assessed for defects in line with site standards
	2.4. ***Cutting techniques*** are used to maximise volume and quality of recovery in line with work order and industry standard lengths
	2.5. Material is cut within site standard tolerances for length and angle relative to centre line in line with OHS requirements
	2.6. Chainsaw is operated in line with OHS and site procedures, and manufacturer's recommendations
	2.7. Debris is cleared and disposed of in line with site procedures and environmental requirements
	2.8. Production and quality ***records and reports*** are processed in line with site procedures and organisational requirements
	2.9. ***Problems*** are identified and reported in line with site procedures
3. Conduct chainsaw maintenance	3.1. Damaged saws or cutting attachments are identified and dealt with according to site procedures and manufacturer's recommendations
	3.2. Chainsaw is cleaned, ***maintained*** and stored in line with manufacturer's recommendations and site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level required for this unit.

Required skills

- Technical skills sufficient to safely and efficiently use a hand-held chainsaw and carry out lock-out procedures on associated machinery; use and maintain relevant tools, machinery and equipment; use appropriate methods to cut materials with a

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REQUIRED SKILLS AND KNOWLEDGE

hand-held chainsaw and maximise volume and quality recovery
- Communication skills sufficient to interact effectively with colleagues and others
- Literacy skills sufficient to review and accurately identify work requirements and accurately locate, record and report information
- Numeracy skills sufficient to estimate and measure lengths and calculate time to complete a task
- Problem solving skills sufficient to identify defects and problems and appropriate response procedures

Required knowledge

- Applicable Commonwealth, State or Territory legislation, regulations, standards, codes of practice and established safe practices relevant to the full range of processes for cutting materials with a hand-held chainsaw
- Organisational and site standards, requirements, policies and procedures for cutting materials with a hand-held chainsaw; organisational communication channels and protocols; and procedures for the recording and reporting of workplace documentation and information
- Environmental protection requirements including the safe disposal of waste material
- Operation and maintenance requirements of a hand-held chainsaw including consequences of blunt or damaged saws
- Effects of defects on recovery
- Common industry terminology
- Communication and interpersonal techniques
- Industry standard length dimensions
- Problem identification and resolution strategies and common fault finding techniques
- Types of tools and equipment and procedures for their use, operation and maintenance

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to provide evidence that they can use a hand-held chainsaw while demonstrating the correct procedures for

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EVIDENCE GUIDE

	cutting materials in line with organisational guidelines
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements of this unit and include demonstration of: • following applicable Commonwealth, State or Territory legislative and regulatory requirements and codes of practice, including OHS and environmental, relevant to cutting materials with a hand-held chainsaw • following organisational policies and procedures relevant to cutting materials with a hand-held chainsaw • following applicable licensing or certification requirements • effective communication and safe working practices • safe cutting of materials using a hand-held chainsaw • cutting materials to maximise volume and quality of recovery according to job requirements • cleaning, maintaining and storing saw • identifying and reporting faults, malfunctions or irregular operation of hand-held chainsaw • appropriate recycling or disposal of waste materials

Context of and specific resources for assessment	• Competency is to be assessed in the workplace or realistically simulated workplace
	• Assessment is to occur under standard and authorised work practices, safety requirements and environmental constraints
	• Assessment of essential underpinning knowledge, other than confirmatory questions, will usually be conducted in an off-site context
	• Assessment is to comply with relevant regulatory or Australian Standards requirements
	• The following resources should be made available:
	  • workplace location or simulated workplace
	  • materials and equipment relevant to undertaking work applicable to this unit
	  • specifications and work instructions

Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the FPI11 Training Package • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of

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EVIDENCE GUIDE

workplace relevant contexts) together with application of underpinning knowledge

- Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of employability skills
- Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge
- Assessment may be applied under project-related conditions (real or simulated) and require evidence of process
- Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances
- Assessment may be in conjunction with assessment of other units of competency
- The assessment environment should not disadvantage the candidate
- Assessment practices should take into account any relevant language or cultural issues related to Aboriginality, gender or language backgrounds other than English
- Where the participant has a disability, reasonable adjustment may be applied during assessment
- Language and literacy demands of the assessment task should not be higher than those of the work role

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

OHS requirements: are to be in line with applicable Commonwealth, State or Territory legislation and regulations, and

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RANGE STATEMENT

organisational safety policies and procedures, and may include:

- personal protective equipment and clothing
- safety equipment
- first aid equipment
- fire fighting equipment
- hazard and risk control
- fatigue management
- elimination of hazardous materials and substances
- awareness of danger zone for kickback
- manual handling including shifting, lifting and carrying
- potential falling objects
- procedures for cutting on slopes
- location of other workers

Legislative requirements: are to be in line with applicable Commonwealth, State or Territory legislation, regulations, certification requirements and codes of practice and may include:

- Australian Standards
- OHS
- the environment
- equal opportunity
- relevant industry codes of practice
- award and enterprise agreements
- industrial relations
- confidentiality and privacy
- duty of care
- heritage and traditional land owner issues

Organisational requirements may include:

- legal
- organisational and site guidelines
- policies and procedures relating to own role and responsibility
- quality assurance
- procedural manuals
- quality and continuous improvement processes and standards
- OHS
- emergency and evacuation procedures

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RANGE STATEMENT

	• fire prevention procedures • recording and reporting requirements • equipment use and maintenance and storage requirements • environmental management requirements (waste disposal, recycling and re-use guidelines) • access and equity principles and practices
Materials may include:	• logs • packs of timber • individual pieces of timber
Job requirements relate to:	information and instructions relevant to cutting operations including: • processing location details • materials to be cut • environmental requirements and features • site plan and may be verbal
Appropriate personnel may include:	• supervisors • clients • colleagues • line management
Tools and equipment may include:	• chainsaws • specific safety attire • maintenance tools
Communication may include:	• verbal and non-verbal language • hand or other agreed signals • eye contact with other operators or personnel • use of electronic devices
Cleared	refers to work area and may include: • clearing the work area of off-cuts and shorts • ensuring saw clearance around material • depositing off-cuts, shorts and debris in recognised areas • clearing surfaces of debris likely to cause saw damage in the cutting area
Supports	are timber or mechanical apparatus that are put under material to stabilise and give clearance to

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RANGE STATEMENT

	ground and may include: • timber bearers • specific frames/benches • timber/steel trolleys
Cutting techniques may relate to:	• cutting positions • work order requirements • industry standard lengths • cutting patterns • maximising volume and quality of recovery • securing the section on each side of the planned cut • cutting procedures to ensure saw clearance around the material to minimise capping and splitting of material
Records and reports may include:	• log book recording of maintenance outcomes, faults, malfunctions and damage, hazards and incidents • may be compiled using a computer-based system or other appropriate organisational communication system to record and report
Problems	may occur in relation to: • defects in material • performance of chainsaw • communication • hazards and risks at the work site • capping and splitting of material • danger zone for kickback
Maintained	refers to maintenance during operation to optimise saw performance and includes: • refuelling • bar checks and oil top up • air filter check, clean and replacement • cleaning of saw body, air intake vents and cooling fans • fitting spare chain and tension chain

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Unit Sector(s)

Not Applicable

Competency field

Competency field Common Technical

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MEM23001A Apply advanced mathematical techniques in a manufacturing engineering or related environment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers advanced *concepts of mathematics* appropriate to engineering situations within the individual's area of engineering expertise.

Application of the Unit

Application of the unit	This unit applies to technician level work that requires basic knowledge and skill relating to exponential, logarithmic and trigonometric equations, basic computer numerical methods and complex figures. This unit only has application in qualifications that are not points based. Band: 0 Unit Weight: 0

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM30012A	Apply mathematical techniques in a manufacturing engineering or related environment

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Prerequisite units		
	MEM16008A	Interact with computing technology

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Graph exponential and logarithmic functions and solve exponential and logarithmic equations.	1.1. Simplify arithmetic and algebraic expressions using the laws of indices and logarithms. 1.2. Sketch the graphs of exponential and logarithmic functions. 1.3. Convert logarithms between bases. 1.4. Draw curves of best fit, interpolate data and estimate constants. 1.5. Solve problems involving growth and decay.
2. Graph trigonometric functions and solve trigonometric equations.	2.1. Sketch graphs of simple trigonometric functions. 2.2. Simplify trigonometric expressions. 2.3. Solve trigonometric equations.
3. Apply basic computer numerical methods to engineering	3.1. Apply appropriate number systems to a range of engineering applications requiring manipulations of decimal, binary and hexadecimal information.

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ELEMENT	PERFORMANCE CRITERIA
situations.	3.2. Apply computer techniques to the solution of engineering problems involving products, sums, divisions and subtraction of variables. 3.3. Apply computer techniques to the solution of engineering problems involving linear, quadratic, logarithmic, trigonometric equations. 3.4. Apply computer techniques to the solution of engineering problems and vector analysis.
4. Sketch and describe complex figures mathematically.	4.1. Sketch complex figures including intersections to implement pattern developments. 4.2. Describe complex figures mathematically. Relate mathematical models to computer graphics models.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- simplifying arithmetic and algebraic expressions using the laws of indices and logarithms
- correctly sketching exponential and logarithmic functions
- accurately converting logarithms from one base to another
- drawing curves of best fit for given sets of data
- accurately interpolating data from plotted data and/or drawn curves
- solving problems involving growth and decay
- accurately sketching trigonometric functions
- simplifying trigonometric expressions using trigonometric identities
- correctly solving trigonometric equations
- selecting an appropriate number system
- developing an appropriate program for the engineering situation
- running a program to achieve an appropriate solution

Required knowledge

Look for evidence that confirms knowledge of:

- the laws of indices and logarithms

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REQUIRED SKILLS AND KNOWLEDGE
• the procedures for simplifying arithmetic and algebraic expressions • the procedures for sketching exponential and logarithmic functions • the effects on the curve due to variation in size of constants • the procedures for converting logarithms between bases • the procedures for drawing curves of best fit and interpolating results • the procedures for estimating constants in suggested relationships • the concept of growth and decay • the procedures for solving problems involving growth and decay • the significance of amplitude, period and phase angle • the procedures for sketching trigonometric functions • the trigonometric identities • the procedures for using trigonometric identities to simplify trigonometric expressions • matching of engineering situations to appropriate number systems • use of number systems for particular applications • identification and description of engineering situations appropriate for analysis using simple programming techniques • procedure for using programs to analyse engineering situation and the identification of program limitations

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply advanced mathematical skills and knowledge to simple engineering applications. Evidence from tasks and projects should/may be used to complement and demonstrate integration of competency. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency

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EVIDENCE GUIDE	
	in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying mathematical concepts to engineering applications, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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RANGE STATEMENT	
situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Complex figures	May include cones, pyramids, spheres, frustums and intersections of figures singularly or in combination

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering science

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MSABLIC001 License to operate a standard boiler

Modification History

Release 3 - Title corrected to 'Licence'.

Release 2 – Content reinstated following Safe Work Australia approval. Editorial changes to clarify WHS Regulations.

Release 1 - New unit of competency, endorsed by NSSC. Content not available pending endorsement by Safe Work Australia, the national agency for Work Health and Safety (WHS) high risk work licensing purposes.

Unit Descriptor

This unit of competency covers the operation of a standard boiler that uses a single fuel source and does not have a pre-heater, superheater or economiser attached.

Operation includes boiler start up, handover, monitoring, shut down and storage. Also covered are preparation for inspection procedures as specified in manufacturer recommendations, identification of maintenance requirements and relevant risk control measures.

Application of the Unit

The standard boilers covered by this unit would typically include boilers with fixed and modulating combustion controls, fixed and modulated air supply, and a single heat source. Operation may include a battery of boilers and boilers that have a single thermal or solar heat source. Boilers meeting the definition of ‘advanced boiler’ are excluded.

This unit in its current form meets state and territory high risk work licensing requirements. Any alteration to the content or outcomes would not be acceptable to regulators for the purpose of licensing.

Licensing/Regulatory Information

This unit is based on the licensing requirements of Part 4.5 of the Model Work Health and Safety (WHS) Regulations, High Risk Work.

Pre-Requisites

Not applicable

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Plan work	1.1	Potential workplace hazards and appropriate risk control measures are identified consistent with appropriate standards to ensure the safety of personnel and equipment
	1.2	Type of boiler is identified and boiler operations planned according to procedures
	1.3	Personal protective equipment is identified necessary for the work requirements
	1.4	Suitable communication methods are identified and confirmed with appropriate personnel
	1.5	Appropriate records are located and reviewed to prepare for boiler operation
2 Start up boiler	2.1	Risk prevention and risk control measures are applied to the work area according to procedures
	2.2	Communication equipment is selected and inspected for serviceability
	2.3	All necessary equipment is selected and inspected for operational effectiveness according to procedures, including establishing water level
	2.4	Boiler is visually checked for any damage or defects with any found reported and recorded according to procedures with appropriate action taken
	2.5	Boiler is vented to atmosphere prior to start up

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	2.6	Pre-start up checks are carried out on the boiler and the boiler brought online safely according to procedures
	2.7	Maintenance requirements and any visual faults are identified and reported according to procedures
	2.8	Start up following maintenance and/or repairs, and associated isolations are confirmed, completed, logged and the equipment made serviceable
3 Monitor boiler operation	3.1	Operating status of the boiler is diagnosed
	3.2	Operating log is maintained clearly and accurately according to procedures
	3.3	Boiler, valves, fittings and pressure gauges are monitored according to procedures
	3.4	Boiler water level gauges are blown through both steam and water sides
	3.5	Standby plant and equipment are tested according to procedures
	3.6	Boiler water quality tests, where required, are conducted and results recorded according to procedures
	3.7	Boiler water chemicals, where required, are adjusted after tests, where appropriate, according to procedures with downstream users notified if necessary
	3.8	Automatic blowdown and, where required, boiler is blown down to adjust total dissolved solids (TDS) levels to recommendations
	3.9	Handover information regarding boiler status and operation is communicated clearly to relevant personnel according to procedures
	3.10	Any boiler emergency is responded to immediately in accordance with procedures
4 Shut down boiler	4.1	Boiler is shut down for inspection according to procedures
	4.2	Maintenance requirements and any visual faults are identified and reported according to procedures
	4.3	Where required, boiler is cleaned internally and externally to manufacturer recommendations and procedures
	4.4	Isolations associated with in-service maintenance are completed

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		according to procedures
	4.5	Boiler operating log is completed for shut down
5 Store boiler in shut down mode	5.1	Storage time and condition of storage are identified, where required
	5.2	Boiler is stored in safe condition for access in accordance with manufacturer recommendations and procedures
	5.3	Stored boiler water and chemicals are tested, where required, and handled in accordance with procedures, where storage is for extended periods

Required Skills and Knowledge

Required skills include:

- complying with legislation, Australian Standards, organisational workplace standards, policies, relevant codes of practice, and required safe practices and procedures for planning work, starting and monitoring a boiler, and shutting down and storing a boiler
- performing routine safety and operational procedures
- reading and interpreting maintenance records, operating logs and safety data sheets (SDS)
- communicating faults, malfunctions and workplace hazards accurately to appropriate personnel using suitable communication techniques
- accurately completing reports, operational records and maintenance information in relation to boiler operation
- applying task instructions
- using relevant tools, equipment and personal protective clothing safely
- interpreting boiler operation tables and figures
- applying boiler testing techniques and adjusting boiler water quality
- verifying any problems and boiler faults, demonstrating appropriate response procedures
- applying appropriate risk assessment and risk management techniques
- demonstrating emergency operating procedures
- identifying the boiler energy source required to be isolated and made safe for maintenance, inspection and repairs
- applying boiler cleaning and storage techniques

Required knowledge includes:

- Commonwealth, state and territory work health and safety (WHS) legislation, codes of practice, standards, and advisory standards relevant to boiler operation
- basic principles of heat transfer and thermodynamics in relation to boiler operations
- boiler steam equipment operating principles and operating methods
- types and characteristics of feedwater systems and treatment

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- type and use of equipment and fittings for operation and maintenance of boilers
- function, purpose and operation of main steam stop valve
- boiler auxiliary equipment characteristics and capabilities
- essential fittings required where more than one boiler is installed (e.g. battery of boilers)
- processes for confirming operational status of a boiler
- workplace communication techniques and procedures
- responsibilities for checking and testing boilers
- location and inspection procedures and techniques for inspection and explosion doors
- steam and boiler hazards for cold start and handover
- hierarchy of risk control
- use and application of personal protective equipment
- type and limitations of corrective action and/or adjustments that can be made in response to routine boiler operation problems and emergencies
- various harmful energy sources in boiler operation and the means to effectively isolate these energy sources and make them safe
- modes of boiler storage and procedures for storing boiler in open or closed condition
- SDS and safe chemical handling and storage methods for boiler operation and cleaning
- procedures for cleaning boilers internally and externally
- procedures for recording, reporting and maintenance of workplace records and information

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	• Successful assessment of this unit meets the competency requirements of the Model WHS Regulations, Part 4.5 High Risk Work. • State and territory WHS regulators have mandated use of the Assessment Instruments for this unit which have been endorsed by the national body responsible for WHS matters.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must ensure that candidates can competently and consistently: • comply with WHS licensing legislation • effectively communicate and work safely with others in the work area • effectively conduct hazard identification and risk assessment procedures • effectively demonstrate the ability to identify

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	harmful energy sources and the means to make them safe • effectively plan work, start up, monitor and shut down a boiler according to procedures • effectively conduct boiler diagnosis, testing and handover operation to other personnel.

Context of and specific resources for assessment	• Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the endorsed Assessment Instruments.
	• Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace setting.
	• Assessors must ensure that assessment in the workplace is organised to ensure that all the required equipment and materials and a suitable working area are made available to suit the assessment and the workplace.
	• Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints.
	• Assessment is to comply with relevant appropriate standard requirements.
	• Applicants must have access to:
	  • personal protective equipment for the purpose of the Performance Assessment
	  • appropriate boiler and equipment in safe condition
	  • communication equipment (e.g. two way radios, mobile phones, landline telephones and computers, as applicable).

Method of assessment	Assessment must be conducted using the national WHS endorsed Assessment Instruments. These Instruments provide advice on their application. The use of simulation in the assessment of this unit of competency may be acceptable in certain operational and safety circumstances. • Assessment should be conducted on a one-on-one basis with the assessor. • Assessment may be conducted in conjunction with the assessment of other units of competency. • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge.

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	• Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.
Guidance information for assessment	• Further information about endorsed Assessment Instruments may be obtained from state/territory WHS regulators.

Range Statement

Hazards	Hazards may include, but are not limited to:
	• asbestos lagging
	• chemical hazards
	• thermal hazards
	• manual handling hazards
	• machinery guard requirements
	• hot exposed steam pipe
	• leakage of steam
	• leakage of fuel
	• odour of gas
	• fumes from a liquid chemical spill
	• faulty/broken ladder or hand rail
	• working at heights
	• flammable liquids
	• fire and explosion
	• electrical hazards
	• work area:
	  • illumination
	  • excessive noise from machinery
	  • spillage of oil
	  • rubbish and combustibles
	  • obstruction

Risk control methods	Risk control methods refer to the systematic process of eliminating or reducing the risk to personnel and property through the application of controls. It includes the application of the hierarchy of control: Elimination Substitution Isolation

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	Engineering controls Administrative controls Personal protective equipment
Appropriate standards	Appropriate standards may include, but are not limited to: • legislation • codes of practice • manufacturer specifications • Australian Standards • technical standards (International) • industry standards (where applicable)
Type of boiler	Type of standard boiler may include: • fire tube • water tube • once through boilers • waste heat • electrical • novel or unique

Standard boiler	Standard boiler includes:
	• vessel or an arrangement of vessels and interconnecting parts, wherein water is heated above atmospheric pressure by the application of:
	  • fire
	  • the products of combustion
	  • electrical power
	  • similar means
	The boiler may have:
	• fixed and modulating combustion controls, fixed and modulated air supply, a single fuel source and will have:
	  • valves
	  • gauges
	  • fittings
	  • controls
	  • boiler setting and directly associated equipment

Procedures	Procedures may include, but are not limited to: • manufacturer guidelines (e.g. instructions, specifications or checklists)

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	• industry operating procedures • workplace procedures (e.g. work instructions, operating procedures or checklists)
Equipment	Equipment may include, but is not limited to: • gas monitoring equipment • water testing equipment • fire-fighting equipment • workplace first aid equipment • work platform and associated gear, such as walkways
Communication methods	Communication methods may include, but are not limited to: • verbal and non-verbal language • written instructions • signage • hand signals • listening • questioning to confirm understanding • appropriate worksite protocol
Appropriate personnel	Appropriate personnel may include, but are not limited to: • production workers • maintenance workers • supervisors and managers • other boiler operators • suppliers • colleagues
Records	Records may include, but are not limited to: • operating log books • maintenance records • records of faults and potential faults • isolation procedures • safe operating procedures • daily operating inspections • repairs carried out according to manufacturer recommendations and operating procedures • workplace record keeping requirements • details of any daily or periodic maintenance work • details of yearly programmed or additional maintenance work

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Risk control measures	Risk control measures may include, but are not limited to:
	• barricades and controls
	• machine guarding
	• fall prevention
	• pedestrian controls
	• adequate illumination
	• noise controls
	• signage
	• personal protective equipment:
	  • thermally insulated gloves
	  • hard hat protection
	  • ear protection (muffs or plugs)
	  • chemical resistant gloves and apron
	  • respiratory devices
	  • eye protection
	  • working protective gloves
	  • whole body fire-resistant clothing

Communication equipment	Communication equipment may include, but is not limited to: • two way radios • mobile phones • intercoms • landline telephones • pagers • satellite phones • computers
Pre-start up checks	Pre-start up checks may include, but are not limited to: • testing warning lamps or visual warning indicators • control panel checks • checks of feedwater supply system • fuel supply/heat source system • operation and position of boiler valves • combustion air supply system • boiler water level • essential fittings and gauges • selection of personal protective equipment • inspection and location of inspection and explosion doors (where applicable) • identification of hazards and management of risks

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	and maintenance problems • fire-fighting equipment • manufacturer recommendations and checklists • relevant records and logs
Start up	Start up may include, but is not limited to: • purge boiler furnace • heat input • warm-up reticulation system • venting the boiler of air • steam traps and steam line purge system operations • reticulation line pressure • steam usage and supply
Maintenance	Maintenance may include, but is not limited to: • leaking steam pipe • pressure gauge accuracy • exposed electrical wiring • defective illumination in the workplace • leaking fuel pump gland • leaks in high pressure feed line • leaking gauge glass mounting • leaking safety valve • isolation procedures, hardware and equipment
Faults	Faults may include, but are not limited to: • abnormal operating conditions • boiler tube failure • feedwater supply and/or other major auxiliary loss • wet steam • high dissolved oxygen • pH of water • high conductivity • actuator or valve mechanical or electrical fault/failure • instrument failure • steam leak

Diagnosed	Diagnosed may include, but is not limited to:
	• senses:
	  • audio
	  • smell

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	• touch
	• visual
	• remote or local indicators and recorders
	• computers and alarms:
	  • visible
	  • audible

Operating log	Operating log may include, but is not limited to: • date and time of checking • each check, examination and results • printed and signed name of person who performed the checks • date and time of any lockout or equipment malfunction • results of tests on boiler or feedwater • changes in operation
Valves and fittings	Valves and fittings may include, but are not limited to: • safety valves • gauge glasses • main steam stop valve • feedwater stop valve • feed check valve • blow down valve • steam side/line drain valves • flame failure detection device • water level controller • boiler steam pressure gauge
Monitored	Monitored may include, but is not limited to: • water supply system • checks of steam reticulation line pressure • usage and supply of steam • quality of steam • combustion/heat source system and management • feedwater system • fuel system • combustion air supply • water level • boiler steam pressure • boiler and steam manifold valves (where fitted) • soot blowers (where fitted) • operation of control/safety devices, including

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	control panels
Tested	Tested may include, but is not limited to: • response checks • standby plant ‘cut in’ tests • valve operating checks • hydrostatic tests • performance tests • alarm and protection tests
Tests	Tests may include, but are not limited to: • pH levels • conductivity • oxygen • TDS • hardness • other contaminants
Chemicals	Chemicals may include, but are not limited to: • oxygen scavenger • feedwater additives • other chemicals • hardness • condensate chemicals • pH buffers
Handover	Handover may include, but is not limited to: • previous load requirements • maintenance issue, including equipment isolated for maintenance • operational incidences • read operating log • general inspection of boiler to detect any defects • accept responsibility of boiler • noted equipment malfunctions • required equipment tests
Emergencies	Emergencies may include, but are not limited to: • tube failure • loss of water level • power failure • inadequate housekeeping • explosion • fire

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	• bomb threat • terrorism • personal accidents • chemical spills • major steam leaks • major water leaks and flooding • natural disasters • oil spills Appropriate emergency responses may include, but are not limited to: • identification of emergency • isolation of heat source • selection and application of appropriate fire-fighting equipment and personal protective equipment • notification of downstream users • operation of boiler only when safe to do so • notification of appropriate regulatory authorities, such as state, territory, federal and boiler manufacturer
Shut down	Shut down may include, but is not limited to: • checks of water level • cooling down process • valve settings • equipment isolation • boiler pressure/vacuum • fuel/heat source isolation in accordance with manufacturer recommendations • boiler post-purge
Storage mode	Storage mode may include, but is not limited to: • wet and dry storing • open or closed position

Unit Sector(s)

Machine and process operations (licensed)

Custom Content Section

Not applicable.

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MSABLIC002 License to operate an advanced boiler

Modification History

Release 3 - Title corrected to 'Licence'.

Release 2 - Content reinstated following Safe Work Australia approval. Editorial changes to clarify WHS Regulations

Release1 - New unit of competency, endorsed by NSSC. Content not available pending endorsement by Safe Work Australia, the national agency for Work Health and Safety (WHS) high risk work licensing purposes.

Unit Descriptor

This unit of competency covers the operation of an advanced boiler, including a standard boiler, which may have one or more of the following:

- multiple fuel sources
- pre-heater
- super-heater
- economiser.

Operation includes boiler start up, handover, monitoring, shut down and storage. Also covered are preparation for inspection procedures as specified in manufacturer recommendations, identification of maintenance requirements and relevant risk control measures.

Application of the Unit

The boilers covered by this unit are standard boilers and advanced boilers, including boilers defined in AS 2593:2004 Safety management and supervision systems and AS 3873:2001 Pressure equipment – Operation and maintenance and typically have a modulating combustion air supply and heat source.

This unit in its current form meets state and territory high risk work licensing requirements. Any alteration to the content or outcomes would not be acceptable to regulators for the purpose of licensing.

Licensing/Regulatory Information

This unit is based on the licensing requirements of Part 4.5 of the Model Work Health and Safety (WHS) Regulations, High Risk Work.

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Pre-Requisites

Not applicable

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Plan work	1.1	Potential workplace hazards and appropriate risk control measures are identified consistent with appropriate standards to ensure the safety of personnel and equipment
	1.2	Type of boiler, with associated equipment, is identified and boiler operations planned according to procedures
	1.3	Personal protective equipment is identified necessary for the work requirements
	1.4	Suitable communication methods are identified and confirmed with appropriate personnel
	1.5	Appropriate records are located and reviewed to prepare for boiler operation
2 Start up boiler	2.1	Risk prevention and control measures are applied to the work area according to procedures
	2.2	Communication equipment is selected and inspected for serviceability
	2.3	All necessary equipment is selected and inspected for operational effectiveness according to procedures, including establishing water level
	2.4	Boiler and associated equipment are visually checked for any

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		damage or defects with any found reported and recorded according to procedures with appropriate action taken
	2.5	Boiler is vented to atmospheric pressure prior to start up
	2.6	Pre-start up checks are carried out on the boiler and the boiler and associated equipment brought online safely according to procedures
	2.7	Maintenance requirements and any visual faults are identified and reported according to procedures
	2.8	Start up following maintenance and/or repairs, and associated isolations are confirmed, completed, logged and the equipment made serviceable
3 Monitor boiler operation	3.1	Operating status of the boiler and associated equipment is diagnosed
	3.2	Operating log is maintained clearly and accurately according to procedures
	3.3	Boiler valves, fittings, pressure gauges, combustion management systems, air heaters, super-heaters and economisers (where fitted) are monitored according to procedures
	3.4	Boiler water level gauges are blown through both steam and water sides
	3.5	Standby plant and equipment are tested according to procedures
	3.6	Boiler water quality tests, where required, are conducted and results recorded according to procedures
	3.7	Boiler water chemicals, where required, are adjusted after tests, where appropriate, according to procedures with downstream users notified if necessary
	3.8	Automatic blowdown and, where required, boiler is blown down to adjust total dissolved solids (TDS) levels to recommendations
	3.9	Handover information regarding boiler and associated equipment status and operation is communicated clearly to relevant personnel according to procedures
	3.10	Any boiler emergency is responded to immediately in accordance with procedures
4 Shut down boiler	4.1	Boiler and associated equipment are shut down for inspection according to procedures

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	4.2	Maintenance requirements and any visual faults are identified and reported according to procedures
	4.3	Where required, boiler and associated equipment are cleaned internally and externally to manufacturer recommendations and procedures
	4.4	Isolations associated with in-service maintenance are completed according to procedures
	4.5	Boiler operating log is completed for shut down
5 Store boiler in shut down mode	5.1	Storage time and condition of storage are identified, where required
	5.2	Boiler and associated equipment are stored in safe condition for access in accordance with manufacturer recommendations and procedures
	5.3	Stored boiler water and chemicals are tested, where required, and handled in accordance with procedures, where storage is for extended periods

Required Skills and Knowledge

Required skills include:

- complying with legislation, Australian Standards, organisational workplace standards, policies, relevant codes of practice, and required safe practices and procedures for planning work, starting and monitoring a boiler, and shutting down and storing an advanced boiler
- performing routine safety and operational procedures
- reading and interpreting maintenance records, operating logs and safety data sheets (SDS)
- communicating faults, malfunctions and workplace hazards accurately to appropriate personnel using suitable communication techniques
- accurately completing reports, operational records and maintenance information in relation to advanced boiler operation
- applying task instructions
- using relevant tools, equipment and personal protection clothing safely
- interpreting advanced boiler operation tables and figures
- applying advanced boiler testing techniques and adjusting boiler water quality
- verifying any problems and boiler faults, demonstrating appropriate response procedures
- applying appropriate risk assessment and risk management techniques
- demonstrating emergency operating procedures

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- identifying all boiler energy sources required to be isolated and made safe for maintenance, inspection and repairs
- applying advanced boiler cleaning and storage techniques

Required knowledge includes:

- Commonwealth, state and territory work health and safety (WHS) legislation, standards, codes of practice and advisory standards relevant to boiler operation
- basic principles of heat transfer and thermodynamics in relation to boiler operations
- boiler and steam equipment operating principles and operating methods, including advanced
- types and characteristics of multiple fuel systems for advanced boilers
- types and characteristics of feedwater systems and treatment, including de-aerator
- type and use of equipment and fittings for operation and maintenance of boilers, including advanced
- function, purpose and operation of:
  - pre-heater
  - super-heater
  - economiser
  - air heater
  - feedwater heater
  - attemperator
  - super-heater safety valves
  - economiser relief valves
  - main steam stop valve
- standard and advanced boiler and auxiliary equipment characteristics and capabilities
- essential fittings required where more than one boiler is installed (e.g. battery of boilers)
- processes for confirming operational status of a boiler
- workplace communication techniques and procedures
- responsibilities for checking and testing advanced boilers, including advanced
- location and inspection procedures and techniques for inspection and explosion doors
- steam and boiler hazards for cold start and handover
- hierarchy of risk control
- use and application of personal protective equipment
- type and limitations of corrective action and/or adjustments that can be made in response to routine boiler operation problems and emergencies
- various harmful energy sources in boiler operation and the means to effectively isolate these energy sources and make them safe, with particular consideration to advanced boilers
- modes of standard and advanced boiler storage and procedures for storing boiler in open or closed condition
- SDS and safe chemical handling and storage methods for boiler operation and cleaning
- procedures for cleaning boilers internally and externally, including advanced
- procedures for recording, reporting and maintenance of workplace records and

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information

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	• Successful assessment of this unit meets the competency requirements of the Model WHS Regulations, Part 4.5 High Risk Work • State and territory WHS regulators have mandated use of the Assessment Instruments for this unit which have been endorsed by the national body responsible for WHS matters.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must ensure that candidates can competently and consistently: • comply with WHS licensing legislation • effectively communicate and work safely with others in the work area • effectively conduct hazard identification and risk assessment procedures • effectively demonstrate ability to identify harmful energy sources and the means to make them safe • effectively plan work, start up, monitor and shut down an advanced boiler according to procedures • effectively conduct advanced boiler diagnosis, testing and handover operation to other personnel.
Context of and specific resources for assessment	• Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the endorsed Assessment Instruments. • Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace setting. • Assessors must ensure that assessment in the workplace is organised to ensure that all the required equipment and materials and a suitable working area are made available to suit the assessment and the workplace. • Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints.

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	• Assessment is to comply with relevant appropriate standard requirements.
	• Applicants must have access to:
	  • personal protective equipment for the purpose of the Performance Assessment
	  • appropriate advanced boiler and associated equipment in safe condition
	  • communication equipment (e.g. two way radios, mobile phones, landline telephones and computers, as applicable)

Method of assessment	• Assessment must be conducted using the national WHS endorsed Assessment Instruments. These Instruments provide advice on their application. The use of simulation in the assessment of this unit of competency may be acceptable in certain operational and safety circumstances. • Assessment should be conducted on a one-on-one basis with the assessor. • Assessment may be conducted in conjunction with the assessment of other units of competency. • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.
Guidance information for assessment	• Further information about endorsed Assessment Instruments may be obtained from state/territory WHS regulators.

Range Statement

Hazards	Hazards may include, but are not limited to: • asbestos lagging • chemical hazards • thermal hazards • manual handling hazards • machinery guard requirements • hot exposed steam pipe • leakage of steam

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	• leakage of fuel
	• odour of gas
	• fumes from a liquid chemical spill
	• faulty/broken ladder or hand rail
	• working at heights
	• flammable liquids
	• fire and explosion
	• electrical hazards
	• work area:
	  • illumination
	  • excessive noise from machinery
	  • spillage of oil
	  • rubbish and combustibles
	  • obstruction

Risk control methods	Risk control methods refer to the systematic process of eliminating or reducing the risk to personnel and property through the application of controls. It includes the application of the hierarchy of control: Elimination Substitution Isolation Engineering controls Administrative controls Personal protective equipment
Appropriate standards	Appropriate standards may include, but are not limited to: • legislation • codes of practice • manufacturer specifications • Australian Standards • technical standards (International) • industry standards (where applicable)
Type of boiler	Type of boiler may include: • standard boilers • advanced boilers
Standard boiler	Standard boiler includes: • vessel or an arrangement of vessels and interconnecting parts, wherein water is heated above atmospheric pressure by the application of:

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	• fire
	• the products of combustion
	• electrical power
	• similar means
	The boiler may have:
	• fixed and modulating combustion controls, fixed and modulated air supply, a single fuel source and will have:
	  • valves
	  • gauges
	  • fittings
	  • controls
	  • boiler setting and directly associated equipment

Advanced boiler	Advanced boiler includes:
	• vessel or an arrangement of vessels and interconnecting parts, wherein water is heated above atmospheric pressure by the application of:
	  • fire
	  • the products of combustion
	  • electrical power
	  • similar means
	The boiler may have one or more of the following features:
	• fixed and modulating combustion controls, fixed and modulated air supply, multiple fuel sources, pre-heaters, super-heaters, economisers and will have:
	  • valves
	  • gauges
	  • fittings
	  • controls
	  • boiler setting and directly associated equipment

Procedures	Procedures may include, but are not limited to: • manufacturer guidelines (e.g. instructions, specifications or checklists) • industry operating procedures • workplace procedures (e.g. work instructions, operating procedures or checklists)
Equipment	Equipment may include, but is not limited to:

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	• gas monitoring equipment • water testing equipment • fire-fighting equipment • workplace first aid equipment • work platform and associated gear, such as walkways
Communication methods	Communication methods may include, but are not limited to: • verbal and non-verbal language • written instructions • signage • hand signals • listening • questioning to confirm understanding • appropriate worksite protocols
Appropriate personnel	Appropriate personnel may include, but are not limited to: • production workers • maintenance workers • supervisors and managers • other boiler operators • suppliers • colleagues
Records	Records may include, but are not limited to: • operating log books • maintenance records • records of faults and potential faults • isolation procedures • safe operating procedures • daily operating inspections • repairs carried out according to manufacturer recommendations and operating procedures • workplace record keeping requirements • details of any daily or periodic maintenance work • details of yearly programmed or additional maintenance work
Risk control measures	Risk control measures may include, but are not limited to: • barricades and controls • machine guarding

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	• fall prevention
	• pedestrian controls
	• adequate illumination
	• noise controls
	• signage
	• personal protective equipment:
	  • thermally insulated gloves
	  • hard hat protection
	  • ear protection (muffs or plugs)
	  • chemical resistant gloves and apron
	  • respiratory devices
	  • eye protection
	  • working protective gloves
	  • whole body fire-resistant clothing

Communication equipment	Communication equipment may include, but is not limited to: • two way radios • mobile phones • intercoms • landline telephones • pagers • satellite phones • computers
Pre-start up checks	Pre-start up checks may include, but are not limited to: • testing warning lamps or visual warning indicators • control panel checks • checks of feedwater supply system • fuel supply/heat source systems • operation and position of boiler valves • combustion air supply system • boiler water level • essential fittings and gauges • selection of personal protective equipment • inspection and location of inspection and explosion doors (where applicable) • identification of hazards and management of risks and maintenance problems • fire-fighting equipment • manufacturer recommendations and checklists • relevant records and logs

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Associated equipment	Associated equipment may include, but is not limited to: • multiple fuel sources • pre-heater • super-heater • economiser Associated equipment may also include but is not limited to: • super-heater safety valves • economiser relief valves • air heater • feedwater heater • attemperator • main steam stop valve
Start up	Start up may include, but is not limited to: • purge boiler furnace • heat input • warm up reticulation system • venting the boiler of air • steam traps and steam line purge system operations • reticulation line pressure • steam usage and supply • super-heater • air heater • feedwater heater • economiser
Maintenance	Maintenance may include, but is not limited to: • leaking steam pipe • pressure gauge accuracy • exposed electrical wiring • defective illumination in the workplace • leaking fuel pump gland • leaks in high pressure feed line • leaking gauge glass mounting • leaking safety valve • isolation procedures, hardware and equipment
Faults	Faults may include, but are not limited to: • abnormal operating conditions • boiler tube failure

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	• feedwater supply and/or other major auxiliary loss • wet steam • high dissolved oxygen • pH of water • high conductivity • actuator or valve mechanical or electrical fault/failure • instrument failure • steam leak • associated equipment failure

Diagnosed	Diagnosed may include, but is not limited to:
	• senses:
	  • audio
	  • smell
	  • touch
	  • visual
	• remote or local indicators and recorders
	• computers and alarms:
	  • visible
	  • audible

Operating log	Operating log may include, but is not limited to: • date and time of checking • each check, examination and results • printed and signed name of person who performed the checks • date and time of any lockout or equipment malfunction • results of tests on boiler or feedwater • changes in operation
Valves and fittings	Valves and fittings may include, but are not limited to: • safety valves • gauge glasses • main steam stop valve • feedwater stop valve • feed check valve • blow down valve • steam side/line drain valves • flame failure detection device • water level controller • boiler steam pressure gauge

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	• economiser relief valve • super-heater safety valve
Monitored	Monitored may include, but is not limited to: • water supply system • checks of steam reticulation line pressure • usage and supply of steam • quality of steam • combustion/heat source system and management • feedwater system and condensate returns • fuel systems • combustion air supply • water level • boiler steam pressure • boiler and steam manifold valves • soot blowers • operation of control/safety devices, including control panels
Tested	Tested may include, but is not limited to: • response checks • standby plant ‘cut in’ tests • valve operating checks • hydrostatic tests • performance tests • alarm and protection tests
Tests	Tests may include, but are not limited to: • pH levels • conductivity • oxygen • TDS • hardness • other contaminants
Chemicals	Chemicals may include, but are not limited to: • oxygen scavenger • feedwater additives • other chemicals • hardness • condensate chemicals • pH buffers
Handover	Handover may include, but is not limited to:

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	• previous load requirements • maintenance issues, including equipment isolated for maintenance • operational incidences • read operating log • general inspection of boiler to detect any defects • accept responsibility of boiler • noted equipment malfunctions • required equipment tests
Emergencies	Emergencies may include, but are not limited to: • tube failure • loss of water level • power failures • inadequate housekeeping • explosion • fire • bomb threat • terrorism • personal accidents • chemical spills • major steam leaks • major water leaks and flooding • natural disasters • oil spills Appropriate emergency responses may include, but are not limited to: • identification of emergency • isolation of heat source • selection and application of appropriate fire fighting equipment and personal protective equipment • notification of downstream users • operation of boiler only when safe to do so • notification of appropriate regulatory authorities, such as state, territory, federal and boiler manufacturer
Shut down	Shut down may include, but is not limited to: • checks of water level • cooling down process • valve settings • equipment isolation • boiler pressure/vacuum

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	• fuel/heat source isolation in accordance with manufacturer recommendations • boiler post-purge
Storage mode	Storage mode may include, but is not limited to: wet and dry storing open or closed position

Unit Sector(s)

Machine and process operations (licensed)

Custom Content Section

Not applicable.

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MSAENV272B Participate in environmentally sustainable work practices

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the outcomes required to effectively measure current resource use and carry out improvements including those reducing negative environmental impacts of work practices. This unit is based on the sustainability guideline standard GCSSUS01A Participate in environmentally sustainable work practices.

Application of the Unit

Application of the unit	This competency applies to operators/team members who are required to follow procedures so as to work in an environmentally sustainable manner. This ensures regulatory compliance and also aims at minimising environmental risks and maximises the environmental performance of the process and the organisation. It includes: • Resources used • Potential environmental hazards • Improving environmental performance (within scope of competency and authority). This competency applies to all sectors of the manufacturing industry and members of its value chain. It may also be applied to all sections of an organisation, including office, warehouse etc. This unit will need to be appropriately contextualised as it is applied across an

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	organisation and across different industry sectors.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	This unit has **no** prerequisites	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify current resource use and environmental issues.	1.1. Identify workplace ***environmental and resource efficiency issues***. 1.2. Identify resources used in own work role. 1.3. ***Measure*** and record current usage of resources using ***appropriate techniques***.

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ELEMENT	PERFORMANCE CRITERIA
	1.4. Identify and report workplace environmental hazards to appropriate personnel.
2. Comply with environmental regulations.	2.1. Follow ***procedures*** to ensure ***compliance***. 2.2. Report environmental **incidents** to appropriate personnel.
3. Seek opportunities to improve environmental practices and resource efficiency.	3.1. Follow ***enterprise plans*** to improve environmental practices and resource efficiency. 3.2. Make ***suggestions*** for improvements to workplace practices in own work area.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include the ability to:

- report as required by procedures
- follow procedures and instructions and respond to change
- ask questions and seek clarifications relating to work requirements

Reading and writing is required in order to interpretrequired procedures and complete required workplace forms/reports.

Numeracy is required to interpret numeric workplace information, readings and measurements, handle data as required and complete numeric components of workplace forms/reports.

Required knowledge

Competency includes sufficient knowledge to:

- have a basic understanding of sustainability
- know the environmental hazards/risks, resource use and inefficiencies associated with own workplace (at an appropriate level)
- know the relevant environmental and resource efficiency systems and procedures for own work area
- know the impact of laws and regulations to a level relevant to the work context

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given and to participate in the improvement of environmental and resource efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to: • identify and measure resources used in their job • identify situations likely to lead to an environmental incident • follow procedures related to environmental performance. Consistent performance should be demonstrated. For example, look to see that: • work is routinely to procedures • the minimum of resources is used consistent with the job requirements, good practice and the procedures.
Context of and specific resources for assessment	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. Depending on the selected methods of assessment access may be required to: • workplace procedures and plans • documentation in relation to production, waste, overheads, hazard control/management • reports from supervisors/managers • case study/scenarios
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed: • by demonstration in the workplace

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EVIDENCE GUIDE	
	• using targeted questioning for appropriate portions • by use of a suitable simulation and/or a range of case studies/scenarios • by a combination of these techniques. In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.
Guidance information for assessment	Assessors need to be aware of any cultural issues that may affect responses to questions. Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Procedures	All operations are performed in accordance with procedures including all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.
Environmental and resource efficiency issues	Environmental and resource efficiency issues include minimisation of environmental risks and maximisation of opportunities to improve business environmental performance and to promote more efficient production and consumption of natural resources, for example by: • minimisation of waste, through implementation of the waste management hierarchy

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RANGE STATEMENT	
	• efficient and effective use of energy and other resources • seeking alternative sources of energy • efficient use of materials and appropriate disposal of waste • use of controls to minimise the risk of environmental damage from hazardous substances • efficient water use • reducing emissions • life cycle analysis applied to issues such as energy supply, materials, transport, production
Measure	Measure should be interpreted in a manner consistent with the scope of the job and may include things like: • counting the number of items entering/leaving a work area • reading indicators in the work area • obtaining relevant information from support personnel • other simple means
Appropriate techniques	Appropriate techniques include: • material fed to/consumed by plant/equipment • plant meters and gauges • job cards including kanbans • examination of invoices from suppliers • measurements made under different conditions • examination of relevant information and data.
Compliance	Compliance includes meeting relevant federal, state and local government laws, by-laws, regulations and mandated codes of practice. It also includes any codes and standards that the enterprise applies voluntarily.
Incidents	Incidents include: • breaches or potential breaches of regulations • occurrences outside of standard procedure which may lead to lower environmental performance.
Enterprise plans	Enterprise plans include:

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RANGE STATEMENT	
	• documented policies and procedures • work plans to minimise waste, increase efficiency of water/energy use, minimise environmental hazards
Suggestions	Suggestions include ideas that help to: • prevent and minimise environmental risks and maximise opportunities • reduce emissions of greenhouse gases • reduce use of non-renewable resources • improve energy efficiency • increase use of renewable, recyclable, reusable and recoverable resources • reduce waste • increasing the reusability/recyclability of wastes/products • reduce water usage and/or water wastage.

Unit Sector(s)

Unit sector	

Competency field

Competency field	Competitive manufacturing tools

Co-requisite units

Co-requisite units		

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MSAENV472B Implement and monitor environmentally sustainable work practices

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the outcomes required to effectively analyse the workplace in relation to environmentally sustainable work practices and to implement improvements and monitor their effectiveness. This unit is based on the sustainability guideline standard GCSSUS02A Implement and monitor environmentally sustainable work practices.

Application of the Unit

Application of the unit	This competency applies to those who have responsibility for a specific area of work or who lead a work group or team. It addresses the knowledge, processes and techniques necessary to implement and monitor environmentally sustainable work practices, including the development of processes and tools. It includes: • Identifying areas for improvement • Developing plans to make improvements • Implementing and monitoring improvements in environmental performance. This competency applies to all sectors of the manufacturing industry and members of its value chain. It may also be applied to all sections of an organisation, including office, warehouse etc. This unit will need to be appropriately contextualised as it is applied across an organisation and across different industry sectors.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	This unit has **no** prerequisites	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Investigate current practices in relation to resource usage.	1.1 Identify environmental regulations applying to the enterprise. 1.2 Assess procedures for assessing ***compliance*** with environmental regulations. 1.3 Collect information on environmental and resource efficiency systems and procedures, and provide to the work group where appropriate. 1.4 Measure and record current resource usage by members of the work group.

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ELEMENT	PERFORMANCE CRITERIA
	1.5 Analyse and record current purchasing strategies. 1.6 Analyse current work processes to access information and data and assist in identifying areas for improvement.
2. Set targets for improvements.	2.1 Seek input from stakeholders, key personnel and specialists. 2.2 Access external sources of information and data as required. 2.3 Evaluate alternative solutions to workplace environmental issues. 2.4 Set efficiency targets.
3. Implement performance improvement strategies.	3.1 Source ***techniques***/***tools*** to assist in achieving targets. 3.2 Apply continuous improvement strategies to own work area of responsibility and communicate ideas and possible solutions to the work group and management. 3.3 Integrate environmental and resource efficiency improvement plans for own work group with other operational activities and implement them. 3.4 Seek suggestions and ideas about environmental and resource efficiency management from stakeholders and act upon them where appropriate. 3.5 Implement costing strategies to fully value environmental assets.
4. Monitor performance.	4.1 Document outcomes and communicate reports on targets to key personnel and stakeholders. 4.2 Evaluate strategies. 4.3 Set new targets and investigate and apply new tools and strategies. 4.4 Promote successful strategies and reward participants where possible.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include:

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REQUIRED SKILLS AND KNOWLEDGE
• using relevant environmental and resource efficiency systems, tools and procedures • applying quality assurance systems relevant to own work area • applying relevant supply chain procedures • measurement and calculation techniques • communication/consultation skills to ensure information is supplied to the work group Reading and writing is required to comprehend documentation and interpret environmental and energy efficiency requirements and to document and maintain records Numeracy is required to interpret numeric workplace information, readings and measurements, handle data as required and complete numeric components of workplace forms/reports.
Required knowledge
Required knowledge includes: • how to access and use relevant environmental and resource efficiency systems, tools and procedures • understanding of best practice approaches relevant to own area of responsibility • strategies to maximise opportunities and minimise impacts relevant to own work area • relevant environmental and resource efficiency issues specific to industry practices • methods for measuring and calculating resource usage

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competence in this unit must be able to provide evidence of the ability to implement and monitor integrated environmental and resource efficiency management policies and procedures within an organisation.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

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EVIDENCE GUIDE	
	• monitor and investigate current resource usage • develop plans to improve sustainability • implement environmental improvements. Consistent performance should be demonstrated. For example, look to see that: • environmental performance is routinely monitored and investigated • areas for improvements are followed through and the implemented changes are in turn monitored and investigated.
Context of and specific resources for assessment	This section should be read in conjunction with the range of variables for this unit of competency. Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed: • by demonstration in the workplace • using targeted questioning for appropriate portions • through use of specific project(s) • by use of a suitable simulation and/or a range of case studies/scenarios • by a combination of these techniques. In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or

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EVIDENCE GUIDE	
	similar assessment.
Guidance information for assessment	Assessors need to be aware of any cultural issues that may affect responses to questions. Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Procedures	All operations are performed in accordance with procedures. Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Environmental and resource efficiency issues	Environmental and resource efficiency issues include:
	• addressing environmental and resource sustainability initiatives such as Environmental Management Systems, action plans, surveys and audits
	• reference to standards, guidelines and approaches such as:
	  • ISO 14001 Environmental Management Systems
	  • Life Cycle Analyses

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RANGE STATEMENT	
	• Cradle to cradle • Global Reporting Initiative • Ecological footprinting • Triple Bottom Line reporting • Product Stewardship • determining enterprise's most appropriate waste treatment including waste to landfill, recycling, re-use and wastewater treatment • applying the waste management hierarchy in the workplace • initiating and/or maintaining appropriate enterprise procedures for operational energy consumption, including stationary energy and non stationary (transport) • efficient use of water • minimising greenhouse gas emissions • use of controls to minimise the risk of environmental damage from hazardous substances
Measure	Measuring techniques include: • material fed to/consumed by plant/equipment • plant meters and gauges • job cards including kanbans • examination of invoices from suppliers • measurements made under different conditions • examination of relevant information and data • others as appropriate to the specific industry contexts.
Techniques and tools	Techniques and tools may includeÂ : • visual workplace concepts • measurement, display and/or recording devices • changed work practices/procedures • competence development and awareness training • process and equipment items
Compliance	Compliance includes meeting relevant federal, state and local government laws, by-laws, regulations and codes of practice.
Incidents	Incidents include:

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RANGE STATEMENT	
	• breaches or potential breaches of regulations • occurrences outside of standard procedure which may lead to lower environmental performance
Purchasing strategies	Purchasing strategies include: • influencing suppliers to take up environmental sustainability • selecting materials/components with a lower environmental profile.
Stakeholders, **key personnel and specialists**	Stakeholders, key personnel and specialists include individuals and groups both inside and outside the organisation that have some direct interest in the enterprise's conduct, actions, products and services, including: • employees at all levels of the organisation • customers • suppliers • other organisations • key personnel within the organisation, and specialists outside it who may have particular technical expertise
Suggestions	Suggestions includes ideas that help to: • prevent and minimise environmental risks and maximise opportunities • reduce emissions of greenhouse gases • reduce use of non-renewable resources • make more efficient use of energy, water and other resources • maximise opportunities to re use and recycle materials • identify strategies to offset or mitigate environmental impacts. e.g. purchasing of carbon credits • express purchasing power through the selection of suppliers with improved environmental performance. e.g. purchasing renewable energy and materials with lower embedded carbon • eliminate the use of hazardous and toxic materials increasing the reusability/recyclability of wastes/products.

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Unit Sector(s)

Unit sector	

Competency field

Competency field	Competitive manufacturing tools

Co-requisite units

Co-requisite units		

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MSAENV672B Develop workplace policy and procedures for environmental sustainability

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the outcomes required to develop and implement a workplace sustainability policy, including the modification of the policy to suit changed circumstances. This unit is based on the sustainability guideline standard GCSSUS03A Develop workplace policy and procedures for sustainability.

Application of the Unit

Application of the unit	This competency applies to team leaders/supervisors/managers who are required to develop approaches to environmental sustainability within workplaces, including the development and implementation of policy. It includes: • Communicating with relevant stakeholders • Developing and monitoring sustainability policies • Reviewing and improving sustainability policies. This competency applies to all sectors of the manufacturing industry. It may also be applied to all sections of an organisation, including office, warehouse etc. This unit will need to be appropriately contextualised as it is applied across an organisation and across different industry sectors.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	This unit has **no** prerequisites	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Develop workplace sustainability policy.	1.1 Define ***scope of sustainability policy***. 1.2 Identify and consult ***stakeholders*** as a key component of the policy development process. 1.3 Review environmental sustainability ***strategies*** relevant to all stages of work covered by the policy 1.4 Make recommendations for policy options based on likely effectiveness, timeframes and cost. 1.5 Develop policy is that reflects the organisation's commitment to sustainability as an integral part of the

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ELEMENT	PERFORMANCE CRITERIA
	business planning and as a business opportunity. 1.6 Agree upon appropriate methods of implementation.
2. Communicate the policy.	2.1 Promote the policy, including its expected outcome to key stakeholders. 2.2 Inform those involved in implementing the policy as to outcomes expected, activities to be undertaken and responsibilities assigned.
3. Implement the policy.	3.1 Develop and communicate procedures to help implement the policy. 3.2 Implement ***strategies*** for continuous improvement in resource efficiency. 3.3 Establish record systems for tracking continuous improvements in sustainability approaches and assign responsibilities.
4. Review policy implementation	4.1 Record outcomes and provide feedback to key personnel and stakeholders. 4.2 Investigate success or otherwise of policy. 4.3 Monitor records to identify trends that may require remedial action, and use to promote continuous improvement of performance. 4.4 Modify policy and or ***procedures*** as required to ensure improvements are made.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- developing and implementing systems and procedures to aid in the achievement of sustainability in the workplace
- applying quality assurance systems relevant to own enterprise
- accessing and applying other relevant enterprise polices, procedures and protocols
- relevant industry competency
- interpreting business/strategic plans

This unit requires the ability to:

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REQUIRED SKILLS AND KNOWLEDGE
• read and evaluate complex and formal documents such as policy and legislation • research, analyse and present information • prepare written reports requiring precision of expression and language and structures suited to the intended audience • adjust communication to suit different audiences • deal with different points of view and dissenting stakeholders.
Required knowledge
Required knowledge includes: • understanding of relevant policy development and implementation processes and practices • understanding of the principles, practices and available tools and techniques of sustainability management relevant to the particular industry context • best practice approaches relevant to own work area • equal employment opportunity, equity and diversity principles and occupational health and safety implications of policy/s being developed

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competence in this unit must be able to provide evidence of the ability to develop and implement integrated sustainability policies and procedures within an enterprise. The review of the policy after implementation will also need to be evidenced.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to: • develop relevant policy and procedures that comply with the regulatory requirements and business plans • develop a workable implementation strategy • include measurable criteria for reviewing improvement. Consistent performance should be demonstrated. For

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EVIDENCE GUIDE	
	example, look to see that: • policy implementation is reviewed • policy is developed to be become part of the routine practices of the organisation.
Context of and specific resources for assessment	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. A holistic approach should be taken to the assessment. Competence in this unit may be assessed: • by demonstration in the workplace • using targeted questioning for appropriate portions • through use of specific project(s) • by use of a suitable simulation and/or a range of case studies/scenarios • by a combination of these techniques. In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.
Guidance information for assessment	Assessors need to be aware of any cultural issues that may affect responses to questions. Assessment processes and techniques must be culturally

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EVIDENCE GUIDE	
	appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Procedures	All operations are performed in accordance with procedures. Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Scope of sustainability policy	Scope of sustainability policy include:
	• The area/s of environmental sustainability to be targeted and whether social and economic sustainability will be incorporated
	• The parts of the enterprise to which it is to apply, including whether it is for the whole enterprise, one site, one work area or combinations of these
	• An investigation of the particular business and market context of the industry/ enterprise
	• Addressing sustainability initiatives through reference to standards, guidelines and approaches such as:
	  • ISO 14001 Environmental Management Systems
	  • Life Cycle Analyses

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RANGE STATEMENT	
	• Cradle to grave/cradle to cradle • Global Reporting Initiative • Ecological Footprint Assessment • Triple Bottom Line reporting • Product Stewardship.
Stakeholders	Stakeholders include individuals and groups both inside and outside the organisation that have some direct interest in the enterprise's conduct, actions, products and services, including: • employees at all levels of the organisation • customers • suppliers • regulators • other organisations.
Strategies	Implementation strategies include: • awareness raising among stakeholders • training of staff in principles and techniques of sustainability • promotional activities. Continuous improvement strategies include ongoing measuring, improving and monitoring such as: • Plan, do, check, act cycles • Kaizen (continuous improvement) • Kaizen blitz (breakthrough improvement event) • Six sigma approaches Environmental sustainability strategies include: • reducing toxic material and hazardous chemical use • minimising resource use through changes in processes, facility design and management • supply chain and life cycle management approaches • sourcing renewable energy and low carbon footprint materials • reducing, re-using, recycling and waste

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RANGE STATEMENT	
	reduction • product and process improvements • carbon offsets • reducing greenhouse gas and other emissions

Unit Sector(s)

Unit sector	

Competency field

Competency field	Competitive manufacturing tools

Co-requisite units

Co-requisite units		

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MSAPCI101A Adapt to work in industry

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

This unit covers the fundamental knowledge and skills needed when taking up employment within the manufacturing industry. It includes the application of industry and workplace guidelines and procedures in a day to day work context as well as appropriate work behaviour.

The elements of this unit should always be assessed in conjunction with other units that form part of a specified job function.

Training and assessment against this competency unit must incorporate all relevant legislative and regulatory requirements.

Application of the Unit

Application of the Unit

The unit has applications in qualifications for all occupations in the manufacturing industry and it should be regarded as an integrating unit. When delivered/assessed as part of a qualification, the unit will be customised to ensure its relevance to the real or simulated work activities and related workplaces.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Manage one's own learning	1.1 One's personal goals or vision are considered and articulated
	1.2 Opportunities for learning new ideas and techniques in relation to personal goals are identified
	1.3 Personal learning needs and **skill gaps** are recognised
	1.4 Opportunities for **skills development activities** are identified in liaison with relevant personnel
	1.5 A range of **learning tools and practices** are accessed and applied to the job
	1.6 Advantage is taken of **on-the-job** and **off-the-job learning opportunities**
2 Adapt to and demonstrate appropriate work practice	2.1 Work requirements are identified and interpreted with advice from appropriate persons
	2.2 **Appropriate dress and behaviour** are observed in the workplace
	2.3 Work and personal priorities are identified and a balance is achieved
	2.4 **Time management strategies** are applied to work

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ELEMENT	PERFORMANCE CRITERIA	
		duties
	2.5	Interactions with others is tailored to take into account different backgrounds, cultures and languages
3 Work within organisational requirements	3.1	**Organisational requirements** and key activities of the workplace are identified
	3.2	Relevant **workplace policies and guidelines** are identified and applied to work undertaken
	3.3	**The range of organisational values and cultural norms** are interpreted
	3.4	Any uncertainties are discussed with key personnel and clarified
4 Identify the sectors of the industry	4.1	The **main sectors** of the manufacturing industry, their key activities and the way in which they inter-relate are identified
	4.2	The **roles and responsibilities** of the manufacturing industry are clarified
	4.3	**Key industry representatives** and their roles are identified
	4.4	**Current issues or events** impacting on the industry are identified
5 Identify industry sector products and services	5.1	The **products** provided by the industry sector are identified
	5.2	The **services** provided by the industry sector are identified
	5.3	Appropriate **standards of service** across the industry sector are identified
	5.4	**Quality standards** for products and services as identified by the industry are clarified

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE

REQUIRED KNOWLEDGE

Knowledge and understanding are essential to apply this competency standard in the industry and workplace. The requirements for this competency standard are a knowledge and basic understanding of:

- current events, activities, products and services of the manufacturing industry
- workplace policies, procedures and guidelines
- time management strategies and appropriate workplace etiquette
- workplace equipment, tools and other technologies used in the manufacturing industry and where and how to obtain information and instructions on their safe use and basic care and servicing
- sources of information on the industry sector and skills development activities

REQUIRED SKILLS

To achieve the performance criteria, some complementary skills are required. These are the ability to:

- following directions
- literacy skills in regard to written and verbal communication in the workplace
- basic interpersonal and communication skills (including listening and questioning, receiving feedback)(
- workplace technology skills where appropriate or required
- following relevant OHS and environmental protection procedures and responsibilities
- time management strategies (
- adapt and modify activities depending on differing workplace contexts and environment
- apply relevant industrial or other legislative requirements
- recognise and adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions among staff and others
- recognise limitations, ask for helpand seek clarification or information about work requirements and procedures

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with

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EVIDENCE GUIDE

the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	• Assessment must confirm appropriate knowledge and skills to: • identify and interpret information on sectors in the manufacturing industries • identify and interpret information on the range of products and services produced by manufacturing industries • complete work tasks in accordance with workplace requirements, standards and applicable regulations • adapt to and apply workplace procedures and practice • identify and take advantage of learning opportunities in the workplace • Performance is demonstrated consistently over a period of time and in a suitable range of contexts • Consistently applies required knowledge and skills when adapting to workplace requirements: • Consistently shows evidence of application of relevant workplace procedures, policies, instructionsand regulations, including: • relevant regulatory requirements • workplace procedures, policies and standards • relevant manufacturer's guidelines relating to the operation and use of equipment • Action is taken promptly to report and/or rectify any workplace problems in accordance with workplace procedures • Recognises and adapts appropriately to cultural differences in the workplace, including modes of behaviour and interactions among staff and others • Work is completed systematically with required attention to detail without damage to goods, equipment or personnel
Context of assessment	• Assessment of this unit must be carried out or managed by a registered training organisation: • assessment of knowledge must be conducted

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EVIDENCE GUIDE

	through appropriate written/oral examinations and questions • practical assessment must occur: • in suitable simulations of a work environment organised by the registered training organisation, and/or • in an appropriate workplace
Specific resources required for assessment	Access is required to opportunities and appropriate resources to either: • carry out a range of suitably simulated practical and knowledge assessments that demonstrate the skills and knowledge to adapt to workplace requirements(usually as part of a holistic assessment involving other competency units) • participate in actual workplace activities that demonstrate the skills and knowledge to adapt to workplace requirements

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

1. What are **skill gaps**?	**Skill gaps** include a range of skills needed for the workplace or for a particular job which are currently not developed within an individual. They are different from an individual's 'personal learning needs' as they are skills specifically relevant and required for a particular job. They may include: • physical capacity skills • workplace technology skills such as business equipment, computer technology, machinery, hand tools, bags, security systems • numeracy and literacy skills • customer service skills • communication skills such as listening and understanding, speaking clearly/directly, reading, writing

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RANGE STATEMENT

- technical skills

2. What are **skill development activities**?

Skill development activities may include:

- training courses
- IT courses
- human resources programs
- coaching and mentoring programs
- having access to a mentor for questions and advice
- having the chance to learn a new task or to operate a new piece of equipment or workplace technology
- participating in an external or internal training program
- guided workplace experience

3. What are **learning tools and practices**?

Learning tools and practices may include:

- learning through note taking
- reviewing manuals and training guides
- discussion
- practice
- observation
- trial and error
- or a combination of any of these

4. What **on-the-job opportunities** might be accessed and used?

On-the-job opportunities may include:

- filling in for a co-worker in a new area
- attending talks or seminars arranged by the workplace
- shadowing another co-worker in a different area
- receiving on the job training and supervised practice

5. What **off-the-job opportunities** might be accessed and used?

Off-the-job opportunities may include:

- taking a course with a training provider
- attending conferences or seminars
- attending site visits with supervisor
- participating in workplace social events
- participating in community events

6. What is appropriate **dress and behaviour**?

Appropriate dress and behaviour may include:

- personal dress, safety equipment and dress, presentation

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RANGE STATEMENT

- demeanour and attitude displayed to customers and fellow employees

7. What are **time management strategies**?

Time management strategies may include:

- being punctual
- goal setting
- balancing work and personal priorities or agendas
- prioritisation of required tasks or activities
- planning daily or weekly work
- overcoming procrastination
- dealing with interruptions (contingency planning)
- organising your work environment

8. What are **organisational requirements**?

Organisational requirements may include:

- organisational policies and guidelines
- common organisational practice
- performance plans
- OHS policies, procedures and programs

9. What are **workplace policies and guidelines**?

Workplace policies and guidelines may include but are not limited to:

- attendance
- punctuality
- standards for health and fitness
- obeying orders
- confidentiality
- dress codes
- alcohol and drug restrictions
- personal safety and duty of care related to OHS
- terms and conditions of employment

10. What are **organisational values**?

Organisational values generally refers to those mentioned in a mission or vision statement of a company and may include:

- innovation
- community responsibility
- environment responsibility

11. What are **cultural norms**?

Cultural norms may include:

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RANGE STATEMENT

- manners
- meanings specific to the language of the workplace
- history
- workplace etiquette

12. What are the **main sectors** of the industry?

Main sectors of industry may include:

- textiles, clothing & footwear
- furniture
- chemical manufacturing
- plastics and rubber products manufacturing
- maintenance and engineering
- manufacture of glass or concrete products

13. What are the **roles and** responsibilities of the industry?

The **roles and responsibilities of the industry** may include:

- providing quality products and services
- providing quality customer service
- providing proper training to those in the industry

14. Who are **key industry representatives**?

Key industry representatives may include:

- industry associations
- enterprises
- unions
- legislative bodies

15. What might **current issues or events** include?

Current issues or events may include:

- economic
- environmental
- political
- technological
- supply and demand

16. What are **industry products**?

Industry products are the outcomes of manufacturing processes and may include:

- clothing and footwear
- concrete and glass products
- tyres and plastic car components
- electronic components
- metal products

17. What are **industry services**?

Industry services may include:

- customer support

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RANGE STATEMENT

- product advice
- health, diet advice
- delivery services
- consulting services
- warrantees and/or guarantees

18. What are **service standards**?

Service standards will vary from industry to industry and even from workplace to workplace depending on the job role and context. It may include:

- developing and maintaining product and service knowledge
- identifying customer needs and expectations correctly
- meeting reasonable needs and request of customers within acceptable time frames
- taking opportunities to enhance the quality of products and services
- dealing with conflict situations
- responding to customer complaints
- maintaining a positive and cooperative manner
- establishing relationships with customers
- following appropriate hygiene and safety procedures
- referring difficult complaints to appropriate persons

19. What are **quality standards**?

Quality standards may include:

- consistency standards
- quality specifications
- time requirements
- meeting customer requirements

Unit Sector(s)

Unit sector Manufacturing Pathways

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MSAPCI102A Apply effective work practices

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

This unit covers the knowledge and skills needed to apply effective work practices in an industry. It includes planning, organising and completing work, communicating effectively, working with others, solving problems and adapting to changes.

The elements of this unit should always be assessed in conjunction with other units that form part of a specified job function

Training and assessment against this competency unit must incorporate all relevant legislative requirements.

Application of the Unit

Application of the Unit

The unit has applications across industries and it should be regarded as an integrating unit. When delivered/assessed as part of a qualification, the unit will be customised to ensure its relevance to the real or simulated work activities.

When delivered/assessed as part of a qualification, the unit will be customised to ensure its relevance to the real or simulated work activities and related workplaces.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan, organise and complete daily work	1.1 **Work instructions** and priorities are identified and interpreted in consultation with supervisor
	1.2 An appropriate work plan or daily routine is determined and mapped out
	1.3 Materials, resources or information needed to complete work is determined, collected, and organised
	1.4 Work tasks are completed within designated timelines, quality standards, and instructions
	1.5 Problems that arise are dealt with in a practical, timely and appropriate manner and assistance is sought when required
	1.6 Feedback is sought on work performance and improvements made as required
2 Communicate effectively	2.1 **Appropriate lines of communication** with supervisors, colleagues and customers are identified
	2.2 Effective **communication skills** and **numeracy skills** are used to gather and convey information

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Appropriate non-verbal behaviour is demonstrated
3 Work with others	3.1	Work roles of self and others in the workplace are identified
	3.2	Individual responsibilities and duties to the team are undertaken in a positive manner and in a range of situations to promote cooperation and good relationships
	3.3	Customers and colleagues who have **diverse backgrounds** are respected
4 Use workplace technology	4.1	Appropriate **workplace technology** is selected and used according to workplace and manufacturer's guidelines and instructions
	4.2	Workplace technology is inspected to ensure it is not damaged and is working properly and **precautions** are taken to reduce risks
	4.3	**Appropriate action** is taken when problems with workplace technology occur
	4.4	Workplace technology is cared for according to workplace and manufacturer's guidelines and instructions
5 Solve work problems	5.1	Identify problems and develop practical or creative solutions within the scope of individual responsibility to rectify them
	5.2	Ask for assistance from **key personnel** when appropriate
	5.3	Report workplace problems as required using appropriate **workplace procedures**
6 Adapt to change	6.1	New work requirements or situations are identified, clarified and adapted to
	6.2	A range of possible practical or creative options to deal with workplace challenges are considered
	6.3	A willingness to be open to and trial new ideas and techniques is demonstrated

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge required for this unit.

REQUIRED KNOWLEDGE

Knowledge and understanding are essential to apply this competency standard in the industry and workplace. The requirements for this competency standard are a knowledge and basic understanding of:

- workplace procedures, policies and instructions
- workplace structures and the roles and responsibilities of individuals and team/group members
- basic mathematical operations and techniques
- procedures for identifying and using relevant workplace technology when carrying out workplace calculations
- typical problems in the workplace and appropriate action and solutions
- systems and equipment used in the workplace and the instructions, processes and precautions for their use
- basic principles of teamwork in the workplace

REQUIRED SKILLS

To achieve the performance criteria, some complementary skills are required. These are the ability to:

- use literacy skills in regard to written and verbal communication in the workplace
- use basic interpersonal and communication skills (including listening and questioning, receiving feedback)
- interpret and follow a designated work plan or set of instructions for a job
- plan a daily routine to complete required workplace tasks follow relevant OHS and environmental protection procedures and responsibilities
- time management strategies
- work cooperatively and collaboratively with others to complete tasks
- adapt and modify activities depending on differing workplace contexts and environment
- useappropriate techniques to solve or report problems identified when completing work tasks
- carry out calculations that may be required when completing work tasks, particularly including the four basic mathematical operations
- take appropriate initiatives to deal with problems and to complete tasks
- identify and correctly use equipment, tools and other technology required to complete workplace tasks

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REQUIRED SKILLS AND KNOWLEDGE

- keep required records of workplace activities
- apply relevant industrial or other legislative requirements
- recognise and adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions among staff and others
- recognise limitations, ask for helpand seek clarification or information about work requirements and procedures

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	• Assessment must confirm appropriate knowledge and skills to: • interpret and plan own work activities • complete work activities in collaboration with others in accordance with instructions, procedures and applicable regulations • communicate effectively in the course of work activities • carryout basic calculations required to complete work activities • apply relevant ethical practices and codes of practice in the course of work activities • Performance is demonstrated consistently over a period of time and in a suitable range of contexts • Consistently shows evidence of application of relevant workplace procedures, policies, instructionsand regulations • Action is taken promptly to report and/or rectify any problems in accordance with workplace procedures • Recognises and adapts appropriately to cultural differences in the workplace, including modes of behaviour and interactions among staff and

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EVIDENCE GUIDE

	others(• Work is completed systematically with required attention to detail without damage to goods, equipment or personnel
Context of assessment	Assessment of this unit must be carried out or managed by a registered training organisation and must include an undertaking of a range of different work tasks within reasonable workplace timeframes which includes participation in various, typical workplace communication situations and use a range of workplace technologies. Assessment of knowledge must be conducted through appropriate written/oral examinations. Appropriate practical assessment must occur: • in suitable simulations of a work environment organised by the registered training organisation, and/or • in an appropriate workplace • within reasonable workplace timeframes
Specific resources required for assessment	Access is required to opportunities and appropriate resources to either: • carry out a range of suitably simulated practical and knowledge assessments that demonstrate the skills and knowledge to work effectively (usually as part of a holistic assessment involving other competency units) • participate in actual workplace activities that demonstrate the skills and knowledge to work effectively • access to a range of workplace technologies such as computers, fax machines, telephones, photocopiers and the like

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for

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RANGE STATEMENT

different work environments and situations that may affect performance.

1. What are **work instructions**?

Work instructions may include:

- job sheets
- patterns
- plans
- drawings
- designs
- verbal directions
- customer orders

2. What are effective **communication skills**?

Communication in the workplace may include:

- listening and understanding
- speaking clearly and directly
- reading independently
- writing to audience needs
- group interaction
- the chain of command in which to report
- questioning to obtain information and/or clarify information and understanding
- routine oral reporting
- routine written reporting
- participation in routine meetings in the workplace
- basic recording of discussions

4. What are effective **numeracy skills**?

Effective **numeracy skills** are those which related to the job or specific task and may involve the operations of multiplication, division, addition, subtraction, percentages and/or fractions, and may include those related to:

- estimates of the quantities of materials and resources required to complete a work task
- money (cost, invoices, change, etc.)
- volume
- weight
- time
- length and distance
- speed
- area

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RANGE STATEMENT

- perimeter

5. What are **diverse backgrounds**?

A **diversity of backgrounds** may include, but is not limited to different:

- ages
- genders
- culture
- personal values or beliefs
- race
- religion
- political persuasion

6. What is **workplace technology**?

Workplace technology may vary widely from industry to industry and may include:

- business equipment such as fax machines, telephones, photo copiers, cutting machines, cameras, voice recorders
- computer technology such as laptops, PCs, digital cameras, zip drives, modems, scanners, printers
- other technology such as machinery, hand tools, , lifts, security systems

7. What are **precautions**?

Workplace technology **precautions** may include:

- routine checking of equipment
- regular backups of data
- keeping a log book of detected faults
- checking that repairs have been carried out
- using appropriate clothing

8. What is **appropriate action**?

Appropriate action may include:

- contacting a supervisor, manager
- contacting the manufacturer
- contacting a service provider
- reporting and documenting the problem

9. Who are **key personnel**?

Key personnel may include:

- supervisor
- manager
- fellow colleagues
- team members

10. What are **workplace procedures**?

Workplace procedures may include but are not limited to:

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RANGE STATEMENT

- organisational policies and guidelines
- common organisational practice
- performance plans
- OHS policies, procedures and programs
- relevant legislative requirements in areas such as OHS, privacy , anti-discrimination, environmental protection, trade practices, etc
- relevant licence requirements and related regulations

Unit Sector(s)

Unit sector Manufacturing Pathways

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MSAPCI103A Demonstrate care and apply safe practices at work

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

This unit covers the knowledge and skills needed to understand, apply and satisfy safe work practices in an industry. It includes identifying and following work procedures for hazards and risks, monitoring and maintaining cleanliness and tidiness at work, and reporting hazards and risks in appropriate ways. It may apply to occupational health and safety (OHS) requirements and/or internal workplace policies and procedures.

The elements of this unit should always be assessed in conjunction with other units that form part of a specified job function.

Training and assessment against this competency unit must incorporate all relevant OHS and related legislative requirements.

Application of the Unit

Application of the Unit

The unit has applications across industries. When delivered/ assessed as part of a qualification the unit will be customised to ensure its relevance to the real or simulated work activities. The workplace environment may include a school classroom or workshop equipped with the appropriate workplace equipment, RTO premises, or an enterprise environment where a high level of supervision exists.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Follow workplace OHS procedures	1.1 Relevant OHS, workplace **hazard control procedures** and **safe work practices** are identified, interpreted and applied to work
	1.2 Workplace procedures for reporting hazards are identified and adhered to in a prompt and efficient manner
	1.3 All relevant work activities are undertaken in a safe manner according to OHS guidelines, enterprise policies and procedures
	1.4 The work area is assessed regularly and procedures to report, remove or minimise potential **hazards** are followed
	1.5 **Personal protection clothing and equipment** is correctly used in accordance with established safety and workplace procedures
2 Maintain personal well-being in the	2.1 **Risks to personal well-being** which may affect safe performance in the workplace are

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ELEMENT	PERFORMANCE CRITERIA
workplace	identified and strategies to prevent them are put into place
	2.2 Procedures for maintaining a tidy and clean personal work area are identified, interpreted and followed
3 Be aware of and report on safety of self and others	3.1 Situations which may endanger the individual or other workers are identified and corrected or reported
	3.2 Incidents and injuries to self or others on the job are dealt with in a timely manner and reported to **appropriate persons**
	3.3 **Participative arrangements** to foster safe working practises are contributed to, as appropriate
4 Deal with emergency situations	4.1 **Emergency situations** are recognised and required action is taken within scope of individual responsibility
	4.2 Emergency procedures are followed in accordance with organisational procedures
	4.3 Assistance from colleagues and/or other authorities is sought where appropriate

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge required for this unit.

REQUIRED KNOWLEDGE

Knowledge and understanding are essential to apply this competency standard in the industry and workplace. The requirements for this competency standard are a knowledge and basic understanding of:

- procedures related to OHSto be followed in the work area concerned
- workplace hazards and ways to minimise or remove them
- workplace equipment, materials, housekeeping equipment and the processes and precautions for their use

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REQUIRED SKILLS AND KNOWLEDGE

- personal protective clothing and equipment relevant to the job and job context
- appropriate hygiene and safety standards

REQUIRED SKILLS

To achieve the performance criteria, some complementary skills are required. These are the ability to:

- use literacy skills in regard to written and verbal communication in the workplace
- use basic interpersonal and communication skills (including listening and questioning, receiving feedback)
- report workplace hazards and occupational health and safety incidents and relatedaction
- solve or report problems identified when dealing with safety hazards and applying appropriate hazard control procedures
- use required personal protection equipment and clothing and other equipment required when following OHS procedures
- recognise limitations and ask for help

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	• Assessment must confirm appropriate knowledge and skills to: • follow workplace procedures for hazard identification and risk control • use relevant personal protective clothing and equipment • communicate effectively with others as required when following safety procedures • Performance is demonstrated consistently over a period of time and in a suitable range

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EVIDENCE GUIDE

	of contexts • Consistently applies required knowledge and skills when completing workplace hazard prevention tasks and following relevant procedures • Consistently shows evidence of application of relevant workplace procedures, policies, instructionsand regulations, including: • OHS regulations and hazard prevention policies and procedures • relevant manufacturer's guidelines relating to the operation and use of equipment • Action is taken promptly to report and/or rectify any safety incidents in accordance with workplace procedures • Recognises and adapts appropriately to cultural differences in the workplace, including modes of behaviour and interactions among staff and others • Work is completed systematically with required attention to detail without damage to goods, equipment or personnel
Context of assessment	• Assessment of this unit must be carried out or managed by a registered training organisation: • assessment of knowledge must be conducted through appropriate written/oral examinations • appropriate practical assessment must occur: • in suitable simulations of a work environment organised by the registered training organisation, with a range of equipment suitable for the job role, and/or • in an appropriate workplace
Specific resources required for assessment	Access is required to opportunities and appropriate resources to either: • carry out a range of suitably simulated practical and knowledge assessments that demonstrate the skills and knowledge to work safely (usually as part of a holistic assessment involving other competency units), and/or • participate in actual workplace activities that demonstrate the skills and knowledge to work safely

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Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

1. What are **hazard control procedures**?

Hazard control procedures may include:

- emergency, fire and accident procedures
- hazard identification and removal or, if this is not possible, establish a hazard control
- use of personal protective
- relevant manufacturer's guidelines relating to the operation and use of equipment
- OHS regulations
- safe use of mechanical, pneumatic, hydraulic and/or electrical equipment
- safe use of chemicals and toxic substances

2. What are **hazards** in the workplace?

Workplace **hazards** may include:

- untidy work conditions including poor and unnecessary obstacles and equipment in work areas
- sharp instruments, or equipment
- noise
- hot substances and equipment
- electricity and water
- electrical equipment
- being careless when using cutting equipment or dealing with heat or hot surfaces
- damaged equipment
- moving machinery
- materials handling
- gases and liquids under pressure
- working at heights
- confined spaces
- inappropriate lifting practices
- dangerous floor surfaces
- movements of equipment, goods, vehicles
- chemicals and other harmful substances including fumes and dust

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RANGE STATEMENT

- toxic substances
- damaged packing material and containers
- inflammable materials and fire hazards
- waste management and disposal
- extremes in weather conditions
- unsuitable lighting levels
- water hazards
- dangerous storage areas

3. What are **safe work practices**?

Safe work practices may include, but are not limited to:

- manual handling procedures
- correct posture
- safe lifting and bending
- using appropriate personal protection equipment
-

4. What are **risks to personal well-being**?

Risk to personal well-being are actions by an individual which affect their ability to work safely and may include:

- smoking, alcohol and drug use
- lack of sleep
- poor diet
- lack of exercise
- stress
- not using appropriate methods when lifting or moving heavy objects
- not wearing proper personal protective equipment

5. What are **personal protection clothing and equipment**?

Personal protection clothing and equipment may include but are not limited to:

- gloves
- masks
- uniform
- safety headwear and footwear
- safety glasses
- two-way radios
- high visibility clothing

6. Who are **appropriate persons**?

Appropriate persons may include:

- workplace personnel

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RANGE STATEMENT

- supervisors
- team leaders
- management
- OHS personnel
- other persons authorised or nominated by the organisation

7. What are **emergency situations**?

Emergency situations may include:

- accidents, including those that do not result in injury
- overheating equipment
- injuries such as cuts, scalds, burns
- health conditions such as fainting, asthma attacks, allergic reactions
- spills and leakages of harmful gas and liquids
- structural failures and breakages
- robbery
- fire
- flooding
- power failures or shorts

8. What are **participative arrangements**?

Participative arrangements may include:

- workplace meetings
- suggestion schemes
- regular communications with team leaders
- information sessions

Unit Sector(s)

Unit sector Manufacturing Pathways

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MSAPCII295A Operate manufacturing equipment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the operation of production equipment and the resolving of routine problems in a simulated or trial manufacturing environment where there is a high degree of direct supervision. This competency is intended to be applied to any item of routine production equipment. This competency can be performed by operators working either independently or as part of a work team.

Application of the Unit

Application of the unit	This unit applies to a learning and assessment environment where access to normal production operations is not available . A typical environment will be for application in a VET in Schools delivery environment or other simulated or trial manufacturing environment where a high degree of direct supervision exists. The unit covers the making of a product or products to meet established quality standards and workplace requirements using routine manufacturing equipment. It includes: • checking specifications and work requirements • following established OHS and hazard minimisation procedures • monitoring equipment operation and reporting process variations • checking product for quality and conformity to specifications • dealing with non-conforming products/materials in accordance with procedures • identifying and rectifying/reporting on routine process

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	problems • completing pro-forma production logs and reports.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Check job requirements.	1.1. Identify ***workplace*** requirements by following established ***procedures*** and practices 1.2. Identify product, materials and ***equipment*** requirements for job(s)

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ELEMENT	PERFORMANCE CRITERIA
2. Control hazards.	2.1. Identify ***hazards*** in the production work area 2.2. Assess the risks arising from those hazards 2.3. Implement measures to control or avoid those risks in line with procedures and duty of care to fellow workers.
3. Prepare equipment for operation as required	3.1. Perform ***pre-start up checks*** 3.2. Suspected unusual or non standard product, materials and equipment are reported to an appropriate person 3.3. If required notify other team members on the intended equipment function and start up 3.4. Check/supply materials to equipment as required 3.5. Start up the item of equipment as required 3.6. Bring to specified conditions and build operating rate steadily, checking expected performance at various stages in accordance with procedures
4. Operate equipment	4.1. Monitor ***equipment operating conditions*** 4.2. Monitor ***product characteristics*** 4.3. Recognise conditions and characteristics which indicate a ***problem or a potential problem*** 4.4. Take ***appropriate action*** in response to problem or potential problem 4.5. Maintain supply of materials and removal of products as required 4.6. Complete required ***records*** 4.7. Keep equipment and work area in a clean, organised and safe condition
5. Prepare equipment for shut down as required	5.1. Perform emergency pause, stop or shutdown as required 5.2. Ensure equipment is free of product or purged as required 5.3. Shut down equipment in accordance with procedures 5.4. Make sure equipment and area is left in a safe condition and ready for ***need***

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• observation • following procedures for start up, operation and shut down of equipment • analysis • problem solving • communication • documenting
Required knowledge
• all major components of the equipment and describe the function of each • principles of equipment operation • equipment operating parameters • equipment and product variables and their interactions. • apply and/or explain: • impact of materials and properties • start-up and shutdown processes • construction and limitations of the equipment • out of specification situations • distinguish between causes of faults such as: • raw materials • instrument failure/malfunction • electrical failure/malfunction • mechanical failure/malfunction • variations in product parameters (temperature, flows, pressure&levels).

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	The competent person will be able to carry out the day to day operation of a piece of production equipment, meeting the demands of productivity and quality while resolving routine problems.

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EVIDENCE GUIDE	
What critical aspects of evidence is required to demonstrate competency in this unit?	It is essential that the equipment be understood and that the importance of critical material properties, settings and readings is known. Competence must be demonstrated in the ability to recognise and analyse potential or actual problem situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to avoid problems rather than on recovery from a problem. Consistent performance should be demonstrated. In particular look to see that: • process conditions are maintained within limits • quality is monitored to minimise wastage • start-up and shutdown occurs first time • signals and alarms are responded to immediately • process measurements are continually made or observed • all OHS requirements are followed. • early warning signs of equipment/processes needing attention or with potential problems are recognised • the range of possible causes can be identified and analysed and the most likely cause determined • appropriate action is taken to ensure a timely return to full performance • obvious problems in related plant areas are recognised and an appropriate contribution made to their solution • pre-start checks are made to ensure equipment is lined up to the plant in accordance with procedures and/or manufacturers specifications. Besides assessing actual operation of manufacturing equipment many aspects may be also be assessed using a range of scenarios, case studies or what ifs as the assessment method. These assessment activities should include a range of problems, including new, unusual situations that may have been generated from past history
In what context should assessment occur?	Assessment will need to occur on an operating item of production equipment although some aspects especially problem solving may be assessed through simulation.
Are there any other units which could or should be assessed with this unit or which relate directly to this	This unit could be assessed concurrently with other relevant units.

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EVIDENCE GUIDE	
unit?	
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit.
What are the specific resource requirements for this unit?	Access to an operating item of production equipment over an extended time.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Workplace	Workplace for this unit covers a manufacturing environment specifically established for learning introductory manufacturing skills. It may be: • a school classroom or workshop equipped to teach manufacturing principles and practices • RTO premises equipped to teach manufacturing principles and practices

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RANGE STATEMENT	
	• an enterprise environment where above average supervision exists and training is occurring. The normal production imperatives have been modified to take into account the training being delivered.
Procedures	Procedures includes all work instructions, standard operating procedures, formulas/ recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of equipment and processes. They may be written, verbal, computer based or in some other form. For the purposes of this Training Package, ' procedures' also includes good operating practice as may be defined by industry codes of practice (eg Good Manufacturing Practice (GMP), Responsible Care) and government regulations.
Equipment	Equipment for the purposes of this unit covers routine or common manufacturing equipment suitable for students operating in a simulated or trial manufacturing environment where there is a high degree of direct supervision. examples include but are not limited to: • guillotines • bending and folding machines • non CNC lathes, especially bench and training lathes • soldering equipment • pedestal drills • bench grinders
Hazards	Workplace hazards include: • hazardous materials • gases and liquids under pressure • moving machinery • cutting edges • electrical equipment • materials handling • environments subject to heat, noise, dusts or vapours.
Pre-start up checks	Pre-start up checks include: • visual checks

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RANGE STATEMENT	
	• completing checklists • checking that safety guards, gates etc are in position and are operational • other checks required by standard operating procedures and manufacturer's instructions
Equipment operating conditions	Equipment operating conditions will be monitored using a range of techniques including: • monitoring of measured or indicated data as shown by gauges, charts etc., (eg. speed, hours on line, pressure, temperature, flow, vibration) • the senses of smell, sight, sound and feel as appropriate.
Product characteristics	Product characteristics includes: • product quality • production rate • defect rate
Problem/potential problem	Problem/potential problem includes: • changes to operating conditions • adverse changes to product characteristics • adverse changes to waste
Appropriate action	Appropriate action includes: • making adjustments in accordance with procedures • stopping the equipment in accordance with procedures • reporting to appropriate person.
Records	Records include: • log sheets/books • job/work sheets • electronic/paper records • verbal/voicemail/email reports
Need	Need includes: • leaving the equipment ready for restart • leaving it safe for maintenance • preparing for a medium/long term shut down

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Unit Sector(s)

Unit sector	Manufacturing Pathways

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSAPCII296A Make a small furniture item from timber

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency standard covers the skills required to make a small timber furniture item in accordance with the requirements of an established design and in a simulated or trial manufacturing environment where there is a high degree of direct supervision. The work may or may not involve electrical machinery. The elements of this unit should always be assessed in conjunction with other units that relate to the requirements of a specified work or job function. Training and assessment against this competency unit must incorporate all relevant OHS and related legislative requirements.

Application of the Unit

Application of the unit	This unit applies to a learning and assessment environment where access to normal production operations is not available . A typical environment will be for application in a VET in Schools delivery environment or other simulated or trial manufacturing environment where a high degree of supervision exists. The unit has applications in qualifications for the broad manufacturing of timber furniture products where the project is based upon the construction of a simple timber item such as:, jewellery boxes, CD racks, timber stools and stationery trays and picture frames. The unit should be applied to a specific 'project'/ or task which has a defined beginning, middle and end, occurs over an extended period of time, and is reflective of furniture manufacturing industry and/or organisation. When delivered/assessed as part of a qualification the unit

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	should be customised to ensure its relevance to a real or simulated work activity and related workplaces and must be delivered and assessed over a period of time.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify job requirements	1.1. Specifications for ***small furniture item*** are identified from ***work instructions***. 1.2. Design is interpreted to determine tool, equipment

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ELEMENT	PERFORMANCE CRITERIA
	and materials and space requirements. 1.3. Cutting, joining and finishing requirements are identified 1.4. OH&S requirements are considered
2. Prepare for work	2.1. ***Suitable work area*** is selected for the task. 2.2. Work area is prepared according to OH&S and ergonomic requirements. 2.3. ***Appropriate tools***, ***equipment*** and ***materials*** are selected in accordance with the specifications for work. 2.4. Equipment and machinery are cleaned, checked, and adjusted in accordance with workplace procedure. 2.5. ***Potential hazards*** are identified from observation of the tools, equipment, materials and workplace and either rectified or reported to supervisor 2.6. ***Records*** are kept in accordance with workplace requirements.
3. Produce work	3.1. Timber is cut according to ***specifications*** and OH&S requirements. 3.2. Edges and surfaces are ***prepared*** according to specifications and OH&S requirements. 3.3. Timber pieces are ***joined*** according to item specifications and OH&S requirements . 3.4. Work is checked against specifications at the identified checkpoints 3.5. Non-conformity with the required specifications including quality standards is ***rectified*** . 3.6. Work is ***finished*** according to specifications, including quality standards and OH&S requirements .
4. Complete work	4.1. Completed work is checked against specifications. 4.2. Unused materials are returned to storage and waste and scrap are dealt with following workplace procedures. 4.3. Work area is cleaned, tools and equipment are returned to storage. 4.4. Documentation is completed following workplace procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Skills required to apply this competency standard in the workplace include: • communicate and work effectively and safely with others • complete a basic furniture construction project to specifications, • comply with OH&S requirements, • correct and safe use of hand tools and power equipment • comply with safety instructions and any OH&S legislation /regulations /codes of practice applicable to workplace operations • collect, organise and understand information related to basic plans • plan and organise activities • use mathematical ideas and techniques for measuring and calculation of areas and estimated materials requirements. • ability to follow instructions and specifications and ask for help where needed
Required knowledge
• workplace procedures and work instructions • quality requirements • furniture construction terminology • tool, equipment and material types and uses • plans, drawings and specifications • safety precautions with hazardous materials and equipment • organisational or workplace structure • evaluation and review procedures • creative thinking techniques

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Knowledge and application of relevant sections of: • occupational, health and safety legislation; statutory

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EVIDENCE GUIDE	
	legislation; • enterprise/site safety procedures; • enterprise/site emergency procedures • preparation and planning of work • perform normal operator maintenance of work area to enable work to be conducted safely and efficiently • relevant standards and procedures • interpret work instructions and locate and apply relevant information. • apply safe handling requirements for equipment, products and materials, including use of personal protective equipment. • follow work instructions, operating procedures and inspection practices to: • minimise the risk of injury to self or others • prevent damage to goods, equipment or products • achieve required production output and product quality. • adapt or vary furnishing product designs. • construct, assemble and finish at least one basic furnishing product from the list in the range statement. • work effectively with others. • modify activities to cater for variations in workplace contexts and environment.
Context of assessment	Assessment may occur on the job or in a workplace simulated facility with relevant equipment, materials, work instructions and deadlines.
Specific resources required for assessment	Access to plans, hand and/or power tools, equipment, materials, woodworking machinery and a work area. Access is required to opportunities and appropriate resources to either: • carry out a range of suitably simulated practical and knowledge assessments that demonstrate the skills and knowledge to work safely (usually as part of a holistic assessment involving other competency units), and/or • participate in actual workplace activities that demonstrate the skills and knowledge to work safely

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
What can a small furniture item include?	A *small furniture item* from timber can include: • small decorative box, with or without a lid • wooden photo album • simple stool/ chair • shelving • CD rack • chopping board • simple table.
What are the work instructions?	Work instructions may include: • job sheets • patterns • plans • drawings and sketches • verbal or illustrated directions from supervisor • number and type of objects to be produced • quality requirements. • OH&S requirements • environmental requirements
What can OH&S requirements include?	OH&S requirements may include: • equipment safety instructions • hazardous and dangerous goods codes • local safe operating procedures • specific workplace rules regarding personal protective wear and equipment.
What can a suitable work area include?	A suitable work area may include: • workbench • desk or table • workshop • shed • floor suitable for layout and assembly

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What can appropriate tools, equipment and materials include?	Appropriate tools will vary according to the project, but may include: • manual saw • jigsaw • hacksaw • clamp • hammer • mallet • screw driver • punch • pliers and pincers • file • miter cutter • 90 degree angle • staple gun • paintbrush • rags • measuring tapes/ rulers • spirit level • bevel • chisel Appropriate equipment could include: • electric saw • electric sander • electric screw driver • power drills • panel laners • horizontal borers • vertical drill presses • pedestal grinders • pencils and marking devices • blades • lathes Appropriate materials could include: • timber • manufactured boards • adhesives • screws • nails

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RANGE STATEMENT	
	• bolts • glue • hinges and metal fasteners • steel • plastics • sandpapers • primers • paints and stains.
What potential hazards include?	Potential hazards may include: • broken or faulty equipment • unnoticed sharp objects • poor lighting • inadequate ventilation • inadequate attention to the activities of others • electrical shortages and power overload • disorganised or cluttered workspace (poor housekeeping) • poor attention when dealing with tools and equipment. • environmental chemicals, heat, dust, noise, gas and oil.
What could records include?	Records could include: • plant and maintenance records • job cards • check sheets • reporting requirements • documenting equipment and/or material defects Workplace procedures relating to the use of tools and equipment. • equipment booking forms and records • attendance records.
What could specifications include?	Specifications could include: • measurements and dimensions • shape • joining methods • surface finish, for example paint, varnish etc. • quality standard

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RANGE STATEMENT	
	• materials to be used
What is involved in making sure edges and surfaces are prepared?	Preparing edges and surfaces could include: • filing • sanding • beveling.
What is involved in making sure timber pieces are joined?	Joining timber pieces could include attaching pieces together with: • nails • screws • glue • staples.
What is involved in making sure non-conformities are rectified?	Rectifying non-conformities could involve: • disassembly of the furniture item • reshaping /resizing or re-cutting component materials • reassembly.
What is involved in making sure work is finished?	Finishing work can include: • sanding • priming • painting • sealing • staining • decorating.
What documentation could be relevant?	Documentation could include: • completing necessary paperwork • communicating with supervisor that you have completed the task • photographing the finisher piece • filing necessary paperwork.

Unit Sector(s)

Unit sector	Manufacturing Pathways

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSAPCII297A Make an object from cloth using an existing pattern

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency has been primarily developed for use in a simulated or trial manufacturing environment where there is a high degree of direct supervision. It covers the skills required to make an object from cloth (such as basic decorative items or clothing) following the requirements of an identified pattern. It may or may not require machinery. The elements of this unit should always be assessed in conjunction with other units that relate to the requirements of a specified work or job function Training and assessment against this competency unit must incorporate all relevant OHS and related legislative requirements.

Application of the Unit

Application of the unit	This unit applies to a learning and assessment environment where access to normal production operations is not available . A typical environment will be for application in a VET in Schools delivery environment or other simulated or trial manufacturing environment where a high degree of supervision exists. The unit applies to the construction of a cloth item that does not require complex sewing or finishing or the development of a pattern. Typical items include tablecloths, hats, towels, cushions, BBQ covers, place mats, cloth bags, scarves, wall hangings, external awnings, and cloth pencil or tool cases. The unit should be regarded as an integrating unit which

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	has application in Certificate I and II qualifications that act as general introductory qualifications to manufacturing industry. It should be applied to a specific 'project' or task which has a defined beginning, middle and end, occurs over an extended period of time, and is reflective of clothing manufacturing industry and/or organisation. When delivered and assessed as part of a qualification the unit should be customised to ensure its relevance to a real or simulated work activity and related workplaces and must be delivered and assessed over a period of time.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify job requirements	1.1. Job requirements for making the ***object from cloth*** are identified from ***work instructions*** 1.2. Instructions for designing and sequencing of work are considered 1.3. Particular measurements or adjustments are interpreted and mapped out 1.4. ***OH&S requirements*** are considered, planned for and observed
2. Prepare for work	2.1. ***Suitable work area*** is selected for the task 2.2. Appropriate ***tools***, ***equipment and materials*** are selected 2.3. ***Potential hazards*** are identified from observation of the tools, equipment, materials 2.4. Required tools and materials are laid out in sequence according to job requirements and work instructions 2.5. Equipment, if required, is checked and adjusted in accordance with workplace procedure
3. Create work	3.1. Fabric is measured, cut and laid out according to specifications 3.2. Fabric is secured or sewed according to quality requirements 3.3. Work is checked against patterns and work sheets at the identified checkpoints 3.4. Non-conformity with the required pattern or quality standard is rectified.
4. Complete work	4.1. Completed work is checked against required quality standards 4.2. Documentation is completed following workplace ***reporting procedures*** 4.3. Work area is cleaned, tools and equipment are returned to storage 4.4. Unused materials are returned to storage and waste and scrap are dealt with following workplace procedures

Required Skills and Knowledge

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REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
• collect, organize and understand information related to basic plans and safety procedures • coordinate work • plan and organise activities • work with others • the ability to ask for limitations and ask for help where needed; and • use mathematical ideas and techniques to correctly complete measurements and calculate areas and estimated materials requirement
Required knowledge
• workplace procedures and work instructions • organisational structure • evaluation and review procedures; • creative thinking techniques.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
What critical aspects of evidence are required to demonstrate competency in this unit?	• identify appropriate materials for use in making cloth items, and any special sewing or handling requirements for those materials. • apply safe operating and handling practices for equipment, products and materials. • interpret work order and locate and apply relevant information. • use patterns select and use tools and equipment appropriate to the task. • follow work instructions, operating procedures and inspection practices to: • prevent damage to goods, equipment or products • maintain required production output and product

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	quality • minimise the risk of injury to self or others. • work effectively with others. • modify activities to cater for variations in workplace contexts and environment. • report process or materials faults, damaged products or equipment. Assessment must confirm appropriate knowledge and skills to: • follow workplace procedures for hazard identification and risk control • use relevant personal protective clothing and equipment • communicate effectively with others as required when following safety procedures Performance is demonstrated consistently over a period of time and in a suitable range of contexts Consistently applies required knowledge and skills when completing workplace hazard prevention tasks and following relevant procedures: Consistently shows evidence of application of relevant workplace procedures, policies, instructions and regulations, including: • OHS regulations and hazard prevention policies and procedures • relevant manufacturer's guidelines relating to the operation and use of equipment Action is taken promptly to report and/or rectify any safety incidents in accordance with workplace procedures Recognises and adapts appropriately to cultural differences in the workplace, including modes of behaviour and interactions among staff and others Work is completed systematically with required attention to detail without damage to goods, equipment or personnel
Context of assessment	Assessment may occur on the job or in a workplace simulated facility with relevant equipment, materials, and work instructions and specifications. Assessment of this unit must be carried out or managed

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EVIDENCE GUIDE	
	by a registered training organisation: Assessment of knowledge must be conducted through appropriate written/oral examinations Appropriate practical assessment must occur: • in suitable simulations of a work environment organised by the registered training organisation, and/or • in an appropriate workplace
Specific resources required for assessment	Access is required to opportunities and appropriate resources to either: • carry out a range of suitably simulated practical and knowledge assessments that demonstrate the skills and knowledge to work safely (usually as part of a holistic assessment involving other competency units), and/or • participate in actual workplace activities that demonstrate the skills and knowledge to work safely

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
What does an object from cloth include?	An object from cloth is a cloth item that does not require sewing of complex shapes or finishing or the development of a pattern and may include: • basic cushions • soft tableware such as placemats or serviettes • basic clothing such as a scarf, simple cloth hat not requiring blocking or a circle skirt, • a basic carry bag • handkerchief • tea towel • wall hanging

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RANGE STATEMENT	
	• pencil case
What are the work instructions?	Work instructions may include: • job sheets including number and type of objects to be produced • patterns for making an object from cloth • plans • drawings and sketches • operating instructions for equipment including safety procedures • designer instructions • quality requirements • verbal directions from a supervisor or instructor
What do OH&S requirements include?	OH&S requirements may include: • legislation • regulations • material handling instructions including hazardous and dangerous goods codes • local safe operating procedures • specific workplace rules and regulations regarding personal protective wear and equipment
What is a suitable work area?	A suitable work area may include: • a bench top or desk • a sewing or layout table • a sewing table with a sewing machine
What are tools, **equipment and materials**?	Tools and equipment may include: • measuring equipment such as tapes and rulers • calculating equipment such as calculators and computers • general cutting and sewing tools including scissors, drills, sewing machines, hemming machines, glue guns • personal protection equipment Materials may include: • plain and patterned fabric • velvet • threads

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RANGE STATEMENT	
	• wadding • foam • tape • fasteners including buttons and hooks
What are potential hazards?	Potential hazards may include broken or faulty equipment, damaged needles, a lack of lighting, untidy working conditions, wet or slippery floors, improperly secured sewing machines, damaged or frayed electrical cables and connections,
What are reporting procedures?	Workplace reporting procedures may include: • completing necessary paperwork • communicating with a supervisor or key person that you are completed with the task • reporting, accidents, injuries and faulty equipment or materials • filing necessary paperwork

Unit Sector(s)

Unit sector	Manufacturing Pathways

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSAPCII298A Make an object from metal

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency standard covers the skills required to make an object from metal in accordance with the requirements of an established design and in a simulated or trial manufacturing environment where there is a high degree of direct supervision. . The elements of this unit should always be assessed in conjunction with other units that relate to the requirements of a specified work or job function.

Application of the Unit

Application of the unit	This unit applies to a learning and assessment environment where access to normal production operations is not available. A typical environment will be for application in a VET in Schools delivery environment or other simulated or trial manufacturing environment where a high degree of supervision exists. This unit applies to the manufacture of a simple metal object such as: small decorative box, with or without a lid; desk pencil holder; metallic photo album; cabinet; shelving; CD rack; metallic picture frame etc. Training and assessment against this competency unit must incorporate all relevant OHS and related legislative requirements. The unit should be regarded as an integrating unit which has application in Certificate I and II qualifications that act as general introductory qualifications to manufacturing industry. It should be applied to a specific 'project' or task which has a defined beginning, middle and end, occurs over an extended period of time, and is reflective of the particular sector of the Manufacturing industry and/or

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	organisation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify job requirements	1.1. Specifications for ***metal*** item are identified from ***work instructions*** 1.2. Design is interpreted to determine process, tool, equipment and materials requirements 1.3. ***OH&S requirements*** are considered and observed

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ELEMENT	PERFORMANCE CRITERIA
	throughout the ***workplace***
2. Prepare for work	2.1. ***Suitable work area*** is selected for the task 2.2. Work area is prepared according to OH&S and ergonomic requirements 2.3. ***Appropriate tools***, ***equipment*** and ***materials*** are selected in accordance with the specifications determined for the work 2.4. Equipment and machinery is cleaned, checked, and prepared for operation in accordance with OH&S requirements and workplace procedure 2.5. ***Potential hazards*** associated with the use of tools, equipment, materials and the workplace are identified and steps taken to eliminate them in accordance with OH&S legislative requirements and established workplace procedures. 2.6. Where required , ***records*** are kept in accordance with workplace requirements
3. Produce work	3.1. Dimensions are transferred from job specifications and/or drawings or sketches and material is marked out to conform to ***specifications*** and templates are ***formed*** using appropriate machinery or tools 3.2. Edges and surfaces are ***prepared*** according to specifications. 3.3. Components are ***joined*** according to project requirements 3.4. Work is checked for conformance with specifications. 3.5. Non-conformity with specifications or quality standard is ***rectified*** 3.6. Work is ***finished*** according to specifications and quality standards
4. Complete work	4.1. Completed work is checked against required quality standards 4.2. Unused materials are returned to storage and waste and scrap are dealt with following workplace procedures 4.3. Work area is cleaned, tools and equipment are returned to storage 4.4. Where required, documentation and records are completed and maintained following workplace procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- apply occupational health and safety standards
- observe relevant statutory requirements and codes of practice
- use, update and where appropriate produce sketches and basic drawings
- select materials and resources
- use and apply basic quality standards
- apply quality procedures
- communicate effectively
- communicate ideas and information to obtain confirmation of work requirements and specifications, coordination with other workers and the reporting of work outcomes and problems.
- collect, organise and understand information related to work orders, basic plans and safety procedures.
- plan and organise activities, including preparation for work and obtaining equipment and materials.
- work with others and in a team to optimise efficient workflow and productivity.
- apply pre-checking and quality techniques to anticipate construction problems, avoid reworking and avoid wastage.
- use of routine workplace tools, equipment, materials and measuring devices.

Depending on the object to be made required skills may also include:

- use cutting and heating equipment
- use of mechanical cutting equipment
- use of workshop plant and equipment
- use of hand and portable power tools

Required knowledge

- the interpretation of a plan representing the product to be made
- the concept of workflow and its relation to manufacture of objects
- identification of appropriate hand and power tools, materials, equipment, processes and procedures.
- occupational health and safety standards and practices.
- relevant statutory requirements and codes of practice
- hand and portable power tools and their application
- mechanical cutting techniques

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REQUIRED SKILLS AND KNOWLEDGE
• paints, sealants and glues • jigs and templates • workshop plant and equipment • manufacture and assembly techniques • common materials used in the manufacture of metal objects • mathematical techniques • communication principles

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Knowledge and application of relevant sections of: • occupational, health and safety legislation; statutory legislation; • enterprise/site safety procedures; • enterprise/site emergency procedures • preparation and planning of work • lay out, marking off/out and developing techniques and procedures • fabrication techniques • shaping techniques • cutting techniques • perform normal operator maintenance of work area to enable work to be conducted safely and efficiently • relevant standards and procedures • completion of work procedures
Context of assessment	Assessment may occur on the job or in a workplace simulated facility with relevant equipment, materials, work instructions and deadlines.
Specific resources required for assessment	Access to plans, hand and/or power tools, equipment, materials and a work area. Access is required to opportunities and appropriate

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EVIDENCE GUIDE	
	resources to either: • carry out a range of suitably simulated practical and knowledge assessments that demonstrate the skills and knowledge to work safely (usually as part of a holistic assessment involving other competency units; and/or • participate in actual workplace activities that demonstrate the skills and knowledge to work safely

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
What can metal include?	Metal ***may include***: • mild steel • galvanised steel • stainless steel • aluminium • brass
What can object from metal include?	***An*** *object from metal* ***can include***: • a small decorative box, with or without a lid • desk pencil holder • metallic photo album • cabinet • shelving • CD rack • metallic picture frame.
What are the work instructions?	***Work instructions*** may include: • job sheets • patterns • plans • drawings and sketches

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RANGE STATEMENT	
	• verbal or illustrated directions from supervisor • number and type of objects to be produced • quality requirements. • OH&S requirements • environmental requirements
What can OH&S requirements include?	***OH&S requirements*** *may include*: • legislative requirements • hazardous and dangerous goods codes • safe operating procedures • specific workplace rules regarding personal protective wear and equipment such as disposable overalls, dust mask, eye and ear protection and gloves.
Workplace	Workplace for this unit means a manufacturing environment specifically established for learning introductory manufacturing skills. It may be: • a school classroom or workshop equipped to teach manufacturing principles and practices • RTO premises equipped to teach manufacturing principles and practices • an enterprise environment where above average supervision exists and training is occurring. The normal production imperatives have been modified to take into account the training being delivered.
What can a suitable work area include?	*A suitable work area* may include: • workbench • desk or table • workshop • shed • durable space
What can appropriate tools, equipment and materials include?	*Appropriate tools* will vary according to the project, but may include: • measuring tapes or rulers • hammers • mallets • squares • bevels • chisels

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RANGE STATEMENT	
	• files • planes • hand saws • cordless drills/ screwdrivers • fixing and joining devices • jigs • clamping devices • pincers *Appropriate equipment* could include: • power saws • power drills • band saws • vertical drill presses • protective eye ware • protective gloves • dust masks • overalls or protective clothing *Appropriate materials* could include: • metal • adhesives • screws • nuts • bolts • hinges and metal fasteners • pencils and markers • paints.
What potential hazards include?	*Potential hazards* may include: • broken or faulty equipment • unnoticed sharp objects • poor lighting • inadequate ventilation • inadequate attention to the activities of others • electrical shortages and power overload • disorganised or cluttered workspace (poor housekeeping) • poor attention when dealing with tools and equipment. • environmental chemicals, heat, dust, noise, gas and oil.

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RANGE STATEMENT	
What could records include?	***Records*** could include: • plant and maintenance records • job cards • check sheets • reporting requirements • documenting equipment and/or material defects • workplace procedures relating to the use of tools and equipment.
What could specifications include and what does it mean for materials to be formed?	***Specifications*** could include: • measurements and dimensions • forming methods could include cutting, bending, rolling, beading.
What is involved in making sure edges and surfaces are prepared?	*Preparing edges and surfaces* could include: • filing • sanding • cleaning • grinding • polishing
What is involved in making sure metal pieces are joined?	*Joining metal pieces* could include attaching pieces together with: • screws, rivets, nuts and bolts • hinging • soldering
What is involved in making sure non-conformities are rectified?	*Rectifying non-conformities* could involve: • deconstructing the assembled pieces • reshaping /resizing or re-cutting elements • reassembling elements.
What is involved in making sure work is finished?	*Finishing work* can include: • filing • polishing • grinding • painting and decorating.

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Unit Sector(s)

Unit sector	Manufacturing Pathways

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSAPCII299A Make an object from plastic

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency standard covers the skills required to make a component from plastic in accordance with the requirements of an established design and in a simulated or trial manufacturing environment where there is a high degree of supervision. The work may or may not involve plastics processing machinery. The elements of this unit should always be assessed in conjunction with other units that relate to the requirements of a specified work or job function. Training and assessment against this competency unit must incorporate all relevant OHS and related legislative requirements.

Application of the Unit

Application of the unit	This unit applies to a learning and assessment environment where access to normal production operations is not available . A typical environment will be for application in a VET in Schools delivery environment or other simulated or trial manufacturing environment where a high degree of supervision exists. The unit has applications in qualifications for the broad manufacturing of plastic products where the project scope can be based upon the construction of a simple plastic item such as:, tool trays and picture frame or could extend to include the production of consumer products or moulded components. The unit should be applied to a specific 'project'/ or task which has a defined beginning, middle and end, occurs over an extended period of time, and is reflective of the plastics manufacturing industry and/or organisation.

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	When delivered/assessed as part of a qualification the unit should be customised to ensure its relevance to a real or simulated work activity and related workplaces and must be delivered and assessed over a period of time.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify job requirements	1.1. Specifications for ***plastic product*** are identified from ***work instructions***. 1.2. Customer requirements are recognised and identified

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ELEMENT	PERFORMANCE CRITERIA
	in the product specification 1.3. Assembly and finishing requirements are identified 1.4. Health, safety and environmental hazards are identified and hazard control measures are implemented. 1.5. Materials, housekeeping and waste management needs are considered
2. Prepare for work	2.1. Equipment requirements are checked and equipment adjusted to appropriate process settings 2.2. ***Materials*** requirements are checked and adjusted as required 2.3. ***Records*** are kept according to company requirements 2.4. Pre-start checks are completed as required 2.5.
3. Operate equipment to produce component	3.1. Equipment is started up following workplace and hazard control procedures 3.2. Process is monitored to ensure quality 3.3. Product quality is monitored as required 3.4. Quality and other problems are identified and rectified
4. Complete work	4.1. Product is assembled according to specifications as required 4.2. Completed work is checked against specifications and customer requirements 4.3. Unused materials are returned to storage and waste and scrap are dealt with following workplace procedures. 4.4. Work area is cleaned; tools and equipment are returned to storage. 4.5. ***Documentation*** is completed following workplace procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE
• communicate and work effectively and safely with others • complete a basic plastic product manufacturing project to specifications • comply with OHS&E requirements, • correct and safe use of hand tools and power equipment • comply with safety instructions and any OH&S legislation /regulations /codes of practice applicable to workplace operations • collect, organise and understand information related to basic plans • plan and organise activities • use mathematical ideas and techniques for measuring and calculation of areas and estimated materials requirements. • follow instructions and specifications and ask for help where needed
Required knowledge
• workplace procedures and work instructions • quality requirements • plastics industry terminology • tool, equipment and material types and uses • plans, drawings and specifications • safety precautions with hazardous materials and equipment • organisational or workplace structure • evaluation and review procedures • creative thinking techniques

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Knowledge and application of relevant sections of: • occupational, health and safety legislation; statutory legislation; • enterprise/site safety procedures; • enterprise/site emergency procedures • environmental requirements Preparation and planning of work Perform normal operator maintenance of work area to

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EVIDENCE GUIDE	
	enable work to be conducted safely and efficiently Relevant standards and procedures Interpretation of work instructions and locate and apply relevant information. Application of safe handling requirements for equipment, products and materials, including use of personal protective equipment. Following work instructions, operating procedures and inspection practices to: • minimise the risk of injury to self or others • prevent damage to goods, equipment or products • achieve required production output and product quality. Ability to adapt or vary plastic component designs. Ability to construct, assemble and finish at least one basic plastic component from the list in the range statement. Ability to work effectively with others. Ability to modify activities to cater for variations in workplace contexts and environment.
Context of assessment	Assessment may occur on the job or in a workplace simulated facility with relevant equipment, materials, work instructions and deadlines.
Specific resources required for assessment	Access to plans, equipment, materials Access is required to opportunities and appropriate resources to either: Carry out a range of suitably simulated practical and knowledge assessments that demonstrate the skills and knowledge to work safely as part of a holistic assessment involving other competency units, and/or Participate in actual workplace activities that demonstrate the skills and knowledge to work safely

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
What can a plastic product include?	A plastic product can include: • small container • picture frame • toys • tool box • automotive plastic products • household items • electrical goods • playground equipment • small boat • any other product made from polymers
What processes can be used to make a plastic product?	A plastic product can be made from: • injection moulding • blow moulding • thermo forming • composite • extrusion • fabrication • rotational moulding • other plastic processing methods
What are the work instructions?	Work instructions may include: • job sheets • patterns • plans • drawings and sketches • verbal or illustrated directions from supervisor • number and type of objects to be produced • quality requirements. • OHS&E requirements
What can OHS& E requirements include?	OHS&E requirements may include: • equipment safety instructions • hazardous and dangerous goods codes

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RANGE STATEMENT	
	• local safe operating procedures • specific workplace rules regarding personal protective wear and equipment. • environmental controls • risk assessment • emergency procedures
What can a suitable work area include?	A suitable work area may include: • on-site host company maintenance or tooling workshop • simulated workshop in RTO • on-site production facilities
What can appropriate tools, **equipment and materials include**?	Appropriate tools will vary according to the project, but may include: • manual saw • jigsaw • hacksaw • clamp • hammer • mallet • screw driver • punch • pliers and pincers • file • miter cutter • 90 degree angle • staple gun • paintbrush • rags • measuring tapes/ rulers • spirit level • bevel • chisel • rollers/scissors Appropriate equipment could include: • electric saw • electric sander • electric screw driver • power drills • vertical drill presses

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RANGE STATEMENT	
	• pedestal grinders • plastics processing equipment • plastics welders such as hot air guns, ultrasonic • injection moulders/blow moulders/rotational moulding equipment/thermoforming equipment Appropriate materials could include: • plastics raw material • extruded plastic sheeting (e.g. perspex, acrylic, polycarbonate) • adhesives • screws • bolts • glue • hinges and metal fasteners • sandpapers • primers • paints
What could potential hazards include?	Potential hazards may include: • broken or faulty equipment • unnoticed sharp objects • poor lighting • inadequate ventilation • inadequate attention to the activities of others • electrical shortages and power overload • disorganised or cluttered workspace (poor housekeeping) • poor attention when dealing with tools and equipment. • environmental chemicals, heat, dust, noise, gas and oil • hot equipment and materials • cuts • back strain
What could records include?	Records could include: • plant and maintenance records • set up, date, batch and materials • check sheets • reporting requirements • documenting equipment and/or material defects

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RANGE STATEMENT	
	• workplace procedures relating to the use of tools and equipment. • equipment booking forms and records • attendance records • quality reports • production reports • log sheets
What could specifications include?	Specifications could include: • measurements and dimensions • shape • joining methods • quality standard • materials to be used • appearance • colour/finish
What is involved in making sure plastic pieces are joined?	Plastic pieces can be joined together by: • glue • ultrasonic/hot air welding • clips • metal fasteners (e.g. screws, bolts, rivets.).
What is involved in making sure non-conformities are rectified?	Rectifying non-conformities could involve: • disassembly of the furniture item • reshaping /resizing or re-cutting component materials • reassembly • refinishing • adjusting process conditions.
What is involved in making sure work is finished?	Finishing work can include: • sanding • priming • painting • decorating. • assembly • polishing • trimming

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Unit Sector(s)

Unit sector	Manufacturing Pathways

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSAPMOHS100A Follow OHS procedures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

On completion of this unit, the worker will be able to recognise hazards commonly occurring at the workplace and follow health and safety instructions and procedures in the workplace.

Application of the Unit

Application of this unit

This competency applies to workers who are required to follow OHS instructions and procedures relating to the work being undertaken. Workers will be aware of the importance of maintaining their own health and safety and the health and safety of others in the workplace. Individual workers will also be capable of dealing with incidents and emergencies within their own scope of responsibility and under the direction of the supervisor.

While the instructions and procedures must be derived from the relevant organisation OHS policies, the worker is not required to understand or interpret these policies. This interpretation should be undertaken by the supervisor when informing workers of the OHS requirements.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

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This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Recognise hazards.	1.1 Identify hazards commonly found in the workplace. 1.2 Check work area routinely before and during work. 1.3 Describe causes of identified hazards.
2. Follow procedures for hazard control.	2.1 Follow procedures to remove or minimise hazards, within the scope of responsibilities and competencies. 2.2 Use required personal protective and other safety equipment. 2.3 Describe the potential consequences of failing to follow these procedures and instructions.
3. Follow emergency procedures.	3.1 Recognise emergency/emergency alarm. 3.2 Go to muster point following procedure. 3.3 Follow instructions related to the emergency.
4. Report problems.	4.1 Report to appropriate people in accordance with workplace procedures when hazards arise.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

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Knowledge and understanding is required of the workplace occupational health and safety (OHS) system sufficient to recognise situations affecting OHS and to take the appropriate action to rectify the situation.

Awareness is required that OHS issues are regulated by State/Territory Acts, regulations, codes of practice and industry standards.

Employees need to be able to follow OHS procedures.

Competence includes the ability to apply and describe procedures for:

- recognising hazards in the workplace
- recognising safety signs and symbols
- recognising hazards commonly found in the workplace and standard controls
- reporting hazards identified to the designated person/according to procedure.

Competence also includes the ability to:

- describe the rights and responsibilities of employees under the OHS legislation
- use and maintain appropriate PPE where required
- communicate OHS issues
- locate and follow OHS procedures under direct supervision.

Language, **literacy and numeracy requirements**

This unit requires the ability to recognise and interpret safety signs and other basic safety information. It also requires the ability to report hazards in an appropriate way and to follow emergency instructions.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations that will include disruptions to normal, smooth operation.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- describe the workplace OHS system and know the importance of critical procedures
- recognise potential situations requiring action
- implement appropriate corrective action.

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Emphasis should be on the ability to avoid a critical incident rather than on recovery from a disaster.

Consistent performance should be demonstrated. For example, look to see that:

- hazards and application of appropriate risk controls are known
- other hazards in the workplace that may arise are known and reporting/taking actions are according to procedure.

Assessment method and context

Assessment for this unit of competency will be on a manufacturing site or in a manufacturing environment.

Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual work environment and will include walk throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays.

This unit requires a body of knowledge which will be assessed through questioning and the use of 'what if' scenarios both in the work environment (during demonstration of normal operations and walk throughs of abnormal operations) and off the job.

Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

Assessment will require access to a manufacturing plant or working environment over an extended period of time, or a suitable method of gathering evidence of knowledge and understanding over a range of situations. A bank of scenarios, case studies, and 'what ifs' will be required, as will a bank of questions which will be used to check the reasoning behind the 'observable actions.'

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This unit of competency describes OHS requirements applicable for all workers whose work involves the use of workplace policies and procedures to maintain a safe work environment for themselves and others.

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It is expected that this competency may be applicable in combination with other industry, occupation or workplace-specific competencies. In all cases it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Hazards and hazard causes

Known hazards, such as those identified in procedures or training, are recognised. The underlying causes of these identified hazards are also described, eg *the identified hazard is slipping, the cause is spilled granules*.

Tools and equipment

This competency includes use of and checks on equipment and tools such as:

- housekeeping checks, such as obstructions on the floor which may create slip/trip hazard
- guards in place
- equipment in safe condition
- work area clear and organised
- nothing unusual/different
- emergency equipment available
- PPE is functional.

Hazards

Typical hazards include:

- handling chemicals and hazardous materials
- chemical and or hazardous materials spillage
- gases and liquids under pressure
- moving machinery
- materials handling
- working at heights, in restricted or confined spaces, or environments subjected to heat, noise, dusts or vapours
- fire and explosion.

Problems

Reporting problems means 'apply procedures to recognise and report hazards'.

Typical problems may include:

- recognition of hazards
- problems encountered in controlling risks associated with hazards
- observation of an injury and/or incident which occurred in the workplace
- clarification of understanding of OHS policies and procedures.

Personnel

Appropriate personnel for OHS referrals may include:

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- employer
- supervisor
- employees elected as OHS representatives
- other personnel with OHS responsibilities.
-

Unit Sector(s)

Not applicable.

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MSAPMOHS110A Follow emergency response procedures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit relates to the appropriate response to emergency situations for any new workers at the workplace, possibly delivered as part of an induction program.

Application of the Unit

Application of this unit

This competency applies to operators who are required to know the signals when an emergency situation takes place as well as the proper procedures to follow in order to save oneself from possible injury and/or death.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Know when emergency happens.	1.1 Locate emergency signals and controls on machines and/or at the worksite. 1.2 Interpret the signals to take appropriate action. 1.3 Identify emergency where there is no mechanical/ electronic signal.
2. Follow emergency procedures.	2.1 Report emergency according to procedures. 2.2 Identify emergency leader. 2.3 Follow workplace procedures and work instructions for dealing with a range of emergencies, under direct supervision of emergency leader. 2.4 Describe the potential consequences of failing to follow these procedures and instructions. 2.5 Describe what to do if the emergency leader cannot be located when emergency occurs.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit. Knowledge and understanding of the emergency response procedures sufficient to recognise emergency situations and then determine the appropriate action.

Knowledge of the relevant OHS and environmental requirements, and organisation standard operating procedures, is required along with an ability to implement them in a manner that is relevant to emergency response practices.

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Competence includes the ability to:

- identify location of emergency signals on machines and/or at the worksite
- identify emergency situations in which there is no mechanical/electronic signal
- report identified emergency signals/situations to the designated person
- identify the emergency leader
- follow emergency procedures.

Evidence of knowledge of all relevant workplace procedures will include:

- emergency, fire and accident procedures
- chemical spill procedures
- procedures for the use of personal protective clothing and equipment
- organisation standard operating procedures (SOPs)
- hazard policies and procedures
- safety procedures
- personal protective clothing relevant to the required response to the emergency situation.

Language, **literacy and numeracy requirements**

This unit requires the ability to recognise and respond to emergency signals or other communication of an emergency.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency.

Assessment will occur over a range of situations that will include disruptions to normal, smooth operation.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- recognise potential emergency situations
- take the appropriate action.

Emphasis should be on the ability to follow proper procedures in order to save oneself from possible injury and/or death.

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Consistent performance should be demonstrated. For example, look to see that:

- emergency situations are recognised and communicated promptly
- emergency procedures are understood and followed.

These aspects may be best assessed using a range of scenarios/case studies/what ifs as the stimulus with a walk through forming part of the response. These assessment activities should include a range of problems that may have been generated from the past incident history of the workplace and incidents on similar operations around the world.

Assessment method and context

Assessment for this unit will be on a processing plant or in a manufacturing environment.

Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual work environment and will include walk throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays. Emergency drills are a common and appropriate simulation.

This unit of competency requires a body of knowledge which will be assessed through questioning and the use of 'what if' scenarios both in the workplace (during demonstration of normal operations and walk throughs of abnormal operations) and off the job.

Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

It is expected that this competency may be applicable in combination with other industry, occupation or workplace-specific competencies. In all cases it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.

Specific resources for assessment

Assessment will require access to an operating plant or work environment over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios, case studies and 'what ifs' will be required as will a bank of questions that will be used to probe the reasoning behind the observable actions.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

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This unit of competency describes emergency situation requirements applicable to all workers. It involves the use of workplace policies and procedures to maintain a safe work environment for oneself and others.

All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This unit of competency includes use of equipment and tools such as PPE required for emergency response.

Hazards

Typical hazards include:

- handling chemicals and hazardous materials
- chemical and or hazardous materials spillage
- gases and liquids under pressure
- moving machinery
- materials handling
- working at heights, in restricted or confined spaces, or environments subjected to heat, noise, dusts or vapours
- fire and explosion.

Personnel

Appropriate personnel for reporting of emergency may include:

- employer
- supervisor
- employees elected as emergency team leader
- other personnel with emergency team leader responsibilities.

Emergency issues

Emergency issues that may need to be raised by workers with designated personnel/ responded to may include:

- observation of injury or incident in the workplace
- fires
- chemical or oil spills
- gas leak or vapour emission
- utilities failure

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- bomb scares
- failure or malfunction of plant/machinery.

Emergency signals

Emergency signals include:

- visual - flashing lights
- auditory - alarms.
-

Unit Sector(s)

Not applicable.

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MSAPMOHS200A Work safely

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

On completion of this unit, the worker will be able to identify Occupational Health and Safety (OHS) hazards, and assess risk, as well as follow instructions and procedures in the workplace with minimal supervision. The worker will also be capable of participating in and contributing to OHS management issues.

Application of the Unit

Application of this unit

This competency applies to all workers as they carry out their normal day to day activities in a safe manner in compliance with legislative requirements and their duty of care.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify hazards and assess risk.	1.1 Identify hazards in the work area before and during work. 1.2 Assess risks for the identified hazards. 1.3 Identify controls for these hazards from procedures. 1.4 Review effectiveness of controls within the scope of authority. 1.5 Identify and report remaining risk.
2. Follow procedures for risk control.	2.1 Control risks when working under minimal supervision by following workplace procedures. 2.2 Select, use and maintain relevant personal protective equipment (PPE). 2.3 Handle and store hazardous materials safely.
3. Follow emergency procedures	3.1 Recognise emergency situations. 3.2 Take appropriate initial emergency action. 3.3 Follow procedures for dealing with a range of emergencies.

ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
4. Initiate suggestions to	4.1 Raise OHS issues with designated personnel in

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
enhance task/job-specific safety.	accordance with workplace procedures and relevant requirements of OHS legislation. 4.2 Contribute to participative arrangements for OHS management in the workplace within organisation procedures and the scope of responsibilities and competencies. 4.3 Provide input to minimise hazards in work area in line with organisation OHS procedures. 4.4 Provide input to opportunities for development of work group's competencies in relation to OHS. 4.5 Support the implementation of procedures to control risks using the hierarchy of control and in accordance with organisation procedures. 4.6 Report to appropriate people in accordance with workplace procedures when non-routine hazards arise.
5. Apply knowledge of OHS legislation and the organisation OHS policies and procedures	5.1 Follow workplace procedures to achieve a safe working environment in accordance with all relevant OHS legislation, including codes of practice relating to particular hazards within the workplace or industry. 5.2 Identify the rights and responsibilities of employees and employers under the relevant OHS legislation. 5.3 Complete (personally or with assistance) hazard, accident or incident reports as required by workplace procedures and relevant sections of OHS legislation.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding is required of the workplace OHS system and relevant industry standards, sufficient to participate in OHS activities and within the scope of work responsibilities and competencies.

Competence includes the ability to apply and describe:

- the identification of hazards and hazardous areas

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- methods for assessing risk
- the identification of standard controls for the hazards
- a simple evaluation of the effectiveness of the controls
- an awareness of the need for further action
- the rights and responsibilities of employees under the OHS legislation
- management systems and procedures for OHS
- the hierarchy of control
- hazard policies, procedures and information
- safety procedures
- emergency, fire and accident procedures
- emergency procedures for handling hazardous materials
- consequences of inappropriate handling of hazardous materials.

Competence also requires the ability to:

- locate, understand and follow workplace OHS procedures
- identify and interpret signs and symbols, including emergency alarms
- recognise hazards common to the industry and in their own workplace
- locate sources of OHS information within the workplace
- select and use personal protective clothing and equipment
- correctly use equipment for handling of chemicals/materials
- interpret and apply relevant Material Safety Data Sheets (MSDS).

Language, **literacy and numeracy requirements**

This unit requires the ability to read and apply hazard information in the workplace and make suggestions to enhance safety.

Writing is required to the level of completing required safety/incident reports.

Numeracy is required to complete incident reports and interpret hazard information.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations that will include disruptions to normal, smooth operation.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Consistent safe working is the critical aspect for which evidence should be sought.

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It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- recognise potential situations requiring action
- implement appropriate corrective action.

Consistent performance should be demonstrated. For example, look to see that relevant workplace procedures are understood, in particular:

- hazard policies and procedures
- emergency, fire and accident procedures
- procedures for the use of personal protective clothing and equipment
- hazard identification and risk assessment procedures.

The following should also be known and understood:

- the hazards and potential risks in the workplace
- the consultation processes, either general or specific to OHS
- OHS information (what is there and how to access it)
- specific hazard policies procedures.

These aspects may be best assessed using a range of scenarios/case studies and 'what ifs' as the stimulus with a walk through forming part of the response. These assessment activities should cover a range of problems, including new, unusual and extreme situations, which may have been generated from the past incident history of the workplace, incidents on similar plants around the world, hazard analysis activities and similar sources.

Assessment method and context

Assessment for this unit of competency will be on a manufacturing site or in a manufacturing environment.

Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays.

This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of 'what if' scenarios both in the workplace (during demonstration of normal operations and walk throughs of abnormal operations) and off the job.

It is expected that this competency may be applicable in combination with other industry, occupation or workplace-specific competencies. In all cases it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.

Specific resources for assessment

Assessment will require access to a manufacturing environment over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies and 'what ifs' will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.

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Range Statement

RANGE STATEMENT

The Range Statement relates to the unit as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This unit of competency describes OHS requirements applicable for all workers whose work involves the use of workplace policies and procedures to maintain a safe work environment for themselves and others.

It is expected that workers will be provided with clear directions, information, instruction, training and appropriate supervision regarding the relevant State/Territory OHS legislation, codes of practice, relevant industry standards, workplace procedures and work instructions.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Identify hazards

Hazard identification is the identification of known hazards in the workplace such as might be included in procedures, training and other workplace methods of identifying hazards.

Assess risks

Risk assessment is used in compliance with the relevant OHS acts and regulations. Assessment is to the extent required by the acts and regulations and is as relevant to the job.

Identify hazard controls

Identification of hazard controls is identifying the controls specified in the procedures or similar. Reviewing their effectiveness includes checking that they are in place and operational in accordance with standard procedure.

Tools and equipment

This competency includes use of equipment and tools such as:

- PPE
- handling aids
- other safety equipment.

Personal Protective Equipment (PPE)

Typical PPE includes:

- hard hats
- goggles/glasses/face shields

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- hearing protection (ear muffs, plugs)
- dusk masks/canister masks/ SCBA/ long range breathers
- gloves/gauntlets
- safety boots
- antistatic equipment
- overalls/aprons/acid jackets/pants.

Selecting and using PPE includes:

- outlining the functions for each type of PPE used in the work environment
- identifying the situations in which specific types of PPE would be used
- using PPE correctly as required in a working environment.

Hazards

Typical hazards include:

- handling chemicals and hazardous materials
- chemical and or hazardous materials spillage
- gases and liquids under pressure
- moving machinery
- materials handling
- working at heights,
- confined spaces
- heat
- noise
- dusts or vapours
- fire and explosion
- dangerous goods.

Personnel

Appropriate personnel for OHS referrals may include:

- employer
- supervisor
- employees elected as OHS representatives
- other personnel with OHS responsibilities.

OHS Issues

OHS issues which may need to be raised by workers with designated personnel may include:

- recognition of hazards/methods of identifying hazards
- problems encountered in controlling risks associated with hazards (any of the controls as per the hierarchy of control which are relevant)
- observation of an injury and/or incident which occurred in the workplace
- clarification of understanding of OHS policies and procedures.

Recognise emergency situation

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Recognition of emergency situations is from alarms, signals or other obvious mechanisms in the workplace.

Unit Sector(s)

Not applicable.

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MSAPMOHS205A Control minor incidents

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit covers control of minor incidents. The competency would be possessed generally by most/all operations personnel and some non-operations personnel. It would require training in addition to that which might typically be part of an induction program, but does not require specialist training such as is given to members of an incident response team. The general purpose of this initial response is to prevent any incident from escalating. In the event of an incident this person may be expected to respond to an incident team member in line with procedures.

This unit does NOT apply to major incidents (see *MSAOHS210A Control non-fire incidents* and *MSAOHS212A Control fire incidents*).

Application of the Unit

Application of this unit

This competency applies to operators who may be called upon to control small incidents in the workplace.

It includes:

- fires of the A,B,C,D,E and F classes
- fuel and other spills
- process overheating
- equipment failure.

The person would:

- safely use first response equipment and coordinate with other actions
- operate incident equipment
- report the use of incident equipment
- mark or position incident equipment to indicate that it has been used and requires servicing.

Generally the person would be part of a team during an incident response. However, he/she may be required to take independent action. At all times they would be liaising and cooperating with other members of the team.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	**PERFORMANCE CRITERIA**
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Evaluate the incident	1.1 Recognise an incident has occurred or is about to occur. 1.2 Assess the incident for type of response and the likely effectiveness of first response action. 1.3 Identify the hazards arising from the incident.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	1.4 Raise the alarm and seek assistance as required. 1.5 Select appropriate response to control incident. 1.6 Determine hazard control measures to be employed. 1.7 Recommend evacuation if appropriate.
2. Control the incident.	2.1 Maintain personal safety at all times. 2.2 Confine the incident to the area of origin where possible. 2.3 Select appropriate equipment to control incident. 2.4 Use equipment in accordance with procedures. 2.5 Clear and secure the incident area. 2.6 Monitor the incident and surrounding conditions and modify response as appropriate. 2.7 Handover to specialist incident response personnel as appropriate.
3. Conclude the incident control.	3.1 Report the use of equipment according to procedures. 3.2 Mark or position incident control equipment after use to indicate it requires servicing or replacing. 3.3 Participate in incident debrief and reporting in accordance with procedures.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

The knowledge referred to in the Evidence Guide for this unit includes:

- classification of fires and incidents
- limitations of first response equipment
- situations that must not be responded to because of the risk to life
- the hazards involved with first response action
- understanding relevant workplace procedures
- selecting appropriate first response equipment
- understanding the theory of fire and other relevant incidents.

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Competence also includes the ability to isolate the causes of problems within the incident response system and to be able to distinguish between causes of problems indicated by:

- damage to first response equipment
- exceeding the limitations of use of incident control equipment or facilities
- inappropriate actions when first response action is undertaken
- inadequacies in facilities that may be used to confine emergencies
- inappropriately identifying the type of incident
- the incorrect use of equipment.

Language, literacy and numeracy requirements

This unit requires the ability to recognise and respond to the signs of an incident and communicate to relevant people as part of the response.

Writing is required to the level of completing required workplace forms and reports.

Numeracy is required to respond to relevant incident data.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

Assessment will occur using a simulation and will be undertaken in a work-like environment.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- correctly respond to incident situations
- implement appropriate action.

Emphasis should be on the ability to stay ahead of the problem rather than to have to take drastic action in order to recover the situation.

Consistent performance should be demonstrated. For example, look to see that:

- the incident is evaluated appropriately
- an appropriate response to the incident, and appropriate response equipment, is selected
- the safety of persons is given the highest priority
- actions taken are effective and do not cause escalation or other incidents
- all reporting is completed in accordance with procedures.

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These assessment activities should cover a range of problems, including new, unusual and improbable situations which may have been generated from past workplace incident history, incidents in similar workplaces around the world, hazard analysis activities and/or similar sources.

Assessment method and context

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Competence in this unit may be assessed:

- in an appropriate, industrial scenario
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

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This unit applies to all sectors of the industry.

This unit will assist individuals to meet some of their obligations under the relevant State/Territory legislation. Responsibility for appropriate contextualisation and application of the unit to ensure compliance however, remains with the individual organisation.

Organisations within the Chemical, Hydrocarbons and Oil Refining industries may find themselves falling under the provisions of various Major Hazard Facilities legislation. In developing this unit consideration has been given to the requirements of Sections 8 and 9 of the National Standard for the Control of Major Hazard Facilities [NOHSC:1014(2002)] and the National Code of Practice for the Control of Major Hazard Facilities [NOHSC:2016(1996)].

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

All operations to which this unit applies are subject to stringent Health, Safety and Environment (HSE) requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Tools and equipment

This competency includes use of equipment and tools such as:

- fire doors
- fire sprinkler systems
- fire alarm systems
- First Aid kits
- fire extinguishers
- hose reels
- smoke vents
- spill control kits.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- determining the nature and size of the incident
- predicting the incident's likely development
- lack of support in an incident
- inappropriate or lack of a means of escape
- lack of availability of control equipment or facilities.
-

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Unit Sector(s)

Not applicable.

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MSAPMOHS210B Undertake first response to non-fire incidents

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit deals with recognising and responding to an emerging incident (except for fire) to provide an appropriate first response

Application of the Unit

Application of the unit	This competency applies to operators who are required to respond to an incident such as a leak, spill or other incident. The worker is not expected to deal with the emerging incident, but to provide an initial first response in order to contain the incident and/or secure the immediate area in order to minimise resultant damages and loss. In this unit it is assumed that the worker is acting according to established workplace procedures.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Assess level of severity.	1.1. Recognise an incident has occurred or is about to occur. 1.2. Access hazard information as appropriate. 1.3. Assess frequency, duration, actual and potential outcome. 1.4. Evaluate and communicate in a timely and appropriate manner the location, nature and extent of the incident.
2. Undertake routine response to minimise affect of the incident.	2.1. Determine first response requirements to contain the incident or evacuate the affected areas. 2.2. Select the appropriate response from the incident procedures and equipment. 2.3. Apply incident procedures as appropriate. 2.4. Clear and secure the incident area. 2.5. Safely locate, access and operate incident response equipment.
3. Notify responsible authorities.	3.1. Follow incident reporting procedures. 3.2. Identify appropriate authorities and notify. 3.3. Clearly and unambiguously communicate information concerning the incident in a timely manner.
4. Undertake safe evacuation.	4.1. Evacuate the area in a safe and controlled manner when first response has failed to control the incident or has proven inappropriate. 4.2. Secure the immediate area of the incident to ensure no further loss occurs to people, equipment, materials, process and environment.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
Competence includes the ability to apply and explain procedures for: • identifying hazard and emergency signs and labels • evacuation of different areas • operating various pieces of incident response equipment • communicating details of an incident situation clearly. Language, literacy and numeracy requirements • This unit requires the ability to respond to data and information indicating an incident. • Writing is required to the level of completing required workplace forms and reports. • Numeracy is required to the level of interpreting and reporting relevant data.
Required knowledge:

• Knowledge and understanding of the incident response procedures and equipment, sufficient to recognise standard and non-standard situations and then determine the appropriate action which is consistent with operating guidelines.
• Knowledge of the relevant OHS and environmental requirements, and organisation standard operating procedures is required along with an ability to implement them in a manner that is relevant to incident response practices.
• Evidence of knowledge of all relevant workplace procedures will include:
  • principles of operation of the incident response equipment
  • hazards policies and procedures
  • incident, fire and accident procedures
  • procedures for the use of personal protective clothing and equipment
  • organisation standard operating procedures (SOPs).

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	The unit will be assessed in as holistic a manner as is

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EVIDENCE GUIDE	
	practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Assessment will occur with simulated industrial incidents and will be undertaken in a work-like environment.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to: • recognise and analyse potential situations requiring action • implement the appropriate corrective action. The reasoning process behind the problem analysis and determining the required actions should be assessed. The emphasis should be on the ability to minimise the affect of an incident situation. Consistent performance should be demonstrated. For example, look to see that: • incident situations are recognised and communicated promptly • action is taken to ensure that the effects of the incident situation are controlled promptly • potential to involve others in the incident is recognised and appropriately communicated • incident procedures are understood and followed. These aspects may be best assessed using a range of scenarios/case studies and 'what ifs' as the stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and extreme situations that may have been generated from the past incident history of the workplace, incidents on similar plants around the world, hazard analysis activities (eg HAZOP) and similar sources.
Context of and specific resources for assessment	Assessment for this unit will be on a processing plant or in a manufacturing environment. Assessment will require access to an operating plant or manufacturing environment over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of

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EVIDENCE GUIDE	
	situations. A bank of scenarios/case studies/what ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions. This unit requires a body of knowledge which will be assessed through questioning and the use of 'what if' scenarios both in the workplace (during demonstration of normal operations and walk throughs of abnormal operations) and off the job. In all cases it may be appropriate to assess this unit concurrently with relevant teamwork and communication units. In a major hazard facility, it may be appropriate to assess this unit concurrently with: • *PMPOHS200 Participate in workplace safety procedures* • *PMASUP220 Monitor and control environmental hazards*.
Method of assessment	Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

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RANGE STATEMENT	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This competency covers all emerging incidents except for fire.
Procedures	All operations are performed in accordance with procedures. Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Tools and equipment	This competency includes use of equipment and tools as required for the situation such as:
	• personal protective equipment such as breathing apparatus
	• incident response equipment such as hand held extinguishers, hose reels, fire blankets
	• evacuation equipment
	• survival equipment
	• standard operating procedures (SOPs)
	• external personnel such as:
	  • police
	  • fire brigade
	  • ambulance.

Hazards	Typical hazards include: • chemicals and hazardous materials • gases and liquids under pressure • moving machinery • materials handling • working at heights, in restricted or confined spaces, or environments subjected to heat, noise, dusts or vapours.
Problems	'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include: • accidents • chemical or oil spills

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RANGE STATEMENT	
	• gas leak or vapour emission • utilities failure • bomb scares.
Personnel	Appropriate personnel for OHS referrals may include: • employer • supervisor • employees elected as incident team leader • other personnel with incident team leader responsibilities.
OHS issues	OHS issues which may need to be raised by workers with designated personnel may include: • recognition of different types of emergencies • problems encountered in control measures and implementation • observation on injury and/or incident occurred in the workplace.
Required functions	Required functions include: • containment of incident, eg chemical/oil spill or gas/vapour leak • communication with internal and external personnel.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit Sector	

Competency field

Competency Field	

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Co-requisite units

Co-requisite Units		

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MSAPMOHS212A Undertake first response to fire incidents

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit is designed to ensure that an appropriate first response to fire incidents in onshore and offshore situations/emergencies is achieved.

Application of the Unit

Application of this unit

This competency applies to operators who are required to respond to fires in the workplace (other than evacuating to the assembly point). It covers the first response (only) to fire, and does not include aggressive fire fighting. Typically this response would be undertaken to contain/extinguish a minor fire or to contain a more major fire while external help arrived.

An ability to work under supervision and/or alone is required. This competency may be delivered as part of an induction program.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify fire emergency and raise alarm.	1.1 Evaluate and communicate the location, nature and extent of the fire emergency in a timely and appropriate manner. 1.2 Determine first response requirements in order to evaluate the need to attack the fire emergencies or evacuate the affected areas.
2. Initiate basic fire responses.	2.1 Maintain personal safety at all times in accordance with OHS guidelines. 2.2 Put on appropriate protective clothing in accordance with organisation procedures. 2.3 Select appropriate extinguishing agents based on knowledge of fire and fuel types. 2.4 Operate basic fighting equipment safely, according to manufacturer specifications and organisation procedure, in order to contain the fire emergency. 2.5 Observe changing conditions at the fire and their effects on fire behaviour are noted and reported.
3. Notify responsible authorities.	3.1 Follow emergency reporting procedures. 3.2 Identify appropriate authorities and notify. 3.3 Clearly and unambiguously communicate information concerning the emergency in a timely manner.
4. Undertake safe evacuation.	4.1 Evacuate area in a safe and controlled manner when first response has failed to control the fire emergency, or has proven inappropriate.

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	4.2 Secure immediate area of the emergency to ensure no further loss occurs to people, equipment, process and environment.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the process sufficient to recognise fire situations and then determine an action that is appropriate within operating guidelines and the scope of their responsibilities and competencies. It would be expected that a person would have skills in fire identification, assessment and application of control measures and be able to demonstrate the use and application of a range of first response fire fighting safety equipment.

A person undertaking this competency must be able to demonstrate knowledge of:

- site specific alarm procedures
- characteristics of fire and fuel types
- composition and uses of extinguishing agents
- basic fire fighting equipment
- site or organisation emergency procedures and response plans
- site specific isolation procedures
- liaison techniques with third parties
- procedures to isolate pipeline sectors.

Language, **literacy and numeracy requirements**

This unit requires the ability to identify different fire fighting media and different fuels.

Writing is required to the level of completing required workplace reports/forms.

Numeracy is required to interpret and report relevant data.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

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Overview of assessment

The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency.

Assessment will occur over a range of situations which will include disruptions to normal, smooth operation.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- recognise and analyse potential situations requiring action
- implement appropriate corrective action.

The emphasis should be on the ability to minimise the effects of the critical situation

Consistent performance should be demonstrated. For example, look to see that:

- identification of different types of fires
- selection and use of appropriate extinguishing agent
- application of defensive fire fighting tactics and techniques
- selection and use of appropriate protective clothing.

These aspects may be best assessed using a range of scenarios/case studies/what ifs as the stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the workplace, incidents on similar plants around the world, hazard analysis activities (eg HAZOP) and similar sources.

Assessment method and context

Assessment for this unit of competency will be on an operating plant or in a manufacturing environment.

Assessment will occur using a simulated fire and will be undertaken in a work-like environment.

Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays.

This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what if scenarios both in the workplace (during demonstration of normal operations and walk throughs of abnormal operations) and off the job.

In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.

In a major hazard facility, it may be appropriate to assess this unit concurrently with PMPOHS200 Work safely.

Specific resources for assessment

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Assessment will require access to an operating plant or manufacturing environment over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what ifs will be required as will a bank of questions that will be used to probe the reasoning behind the observable actions.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

Those persons working, operating or who regularly travel within an onshore or offshore installation or facility would require this competency.

This unit could be applied to any of the following installation or facilities:

- factories and production plants
- onshore/offshore rig/installation
- island based facility
- floating production vessel or platform
- onshore production, processing pipeline systems and/or storage facilities
- pipeline easements
- maintenance bases.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Tools and equipment

This competency includes use of equipment and tools such as:

- personal protective equipment
- such as breathing apparatus
- hand held extinguishers
- hose reels
- fire blankets

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- smoke or self rescue respirators
- mobile and portable equipment
- First Aid equipment
- pipeline repair clamps
- lamb air movers
- barricades and signage
- communications equipment: two-way radios, mobile and satellite phones and pagers
- fire extinguishing media, including water, foam, extinguishing powder, gaseous extinguishing agents, vapourising liquids, other fire extinguishing substances.

Hazards

Typical hazards include:

- smoke, darkness and heat
- electricity
- gas
- structural hazards
- structural collapse
- industrial - machinery, equipment, product
- hazardous products and materials
- unauthorised personnel.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'.

Variables

Key variables to be monitored include:

- failure to control fire with first response methods
- adverse change in weather conditions
- change in flame colour and size
- change in smoke colour
- fire spread and/or other material becoming involved in fire
- signs of structural collapse.

Tactics

Fire fighting tactics may include:

- direct attack
- indirect attack
- combination attack
- exposure protection

but does NOT include internal/offensive attacks.

External personnel

External personnel may include:

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- police
- fire brigade
- ambulance.
-

Unit Sector(s)

Not applicable.

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MSAPMOHS216A Operate breathing apparatus

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit covers competence associated with the operation and maintenance of breathing apparatus equipment in an irrespirable atmosphere.

Application of the Unit

Application of this unit

This competency applies to operators who are required to wear breathing apparatus for part of their job - because they are working in a confined space, with hazardous gases/vapours, in an anoxic atmosphere or for other applications requiring the wearing of breathing apparatus. They may also be required to wear it in emergency situations, however this is not the prime focus of this unit, and so makes this unit different from *PUAFIR207A Operate breathing apparatus open circuit*, as it has no prerequisite and is much broader in its application.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Conduct pre-donning checks and tests on breathing apparatus.	1.1 Inspect breathing apparatus for immediate use in accordance with procedures. 1.2 Report/record faulty or damaged equipment in accordance with procedures.
2. Operate breathing apparatus.	2.1 Identify, monitor and control hazards in accordance with the procedures. 2.2 Establish and maintain communication with appropriate personnel throughout the activity. 2.3 Demonstrate effective application of breathing apparatus, undertaking activities as a member of a team, in accordance with procedures. 2.4 Implement entrapment procedures in accordance with procedures. 2.5 Maintain personal safety at all times.
3. Conclude operations.	3.1 Close down breathing apparatus set in accordance with procedures. 3.2 Remove breathing apparatus set in accordance with procedures. 3.3 Undertake after-use cleaning and maintenance of breathing apparatus in accordance with procedures. 3.4 Make equipment ready for operational use in accordance with procedures.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Underpinning knowledge:

- respiratory system, effects of irrespirable atmospheres on the body, protective equipment
- characteristics, component parts, operation of compressed air breathing apparatus
- operational testing, standard operating procedures and safe work practices when wearing breathing apparatus
- operating breathing apparatus
- use of procedures, personal lines and tallies
- pre-use tests and checks, including serviceability of components, integrity of components, cylinder pressure, integrity of air flow system, ancillary equipment.
- breathing apparatus control, including principles of BA Control, organisation procedures, Stage 1 (one entry point), Stage 2 (multiple entry points), entry/exit control point, entry/exit control officer, timing device
- entrapment procedures, including cease all strenuous activity, activate the distress signal unit, remain calm, relocate to safest available place, call for assistance
- communications, including distress signal unit, portable radio, communications sets, signal lines, hand signals.

Underpinning skills:

- Inspecting, donning, operating in, removal, cleaning, maintaining and returning to operational status of breathing apparatus.

Language, **literacy and numeracy requirements**

This unit requires the ability to interpret any permits or other documentation associated with the wearing of breathing apparatus for the job.

Writing is required to the level of completing required workplace reports.

Numeracy is required to enable the determination of the available working time from a breathing apparatus set and similar activities.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment. Assessors must be satisfied that the person can consistently perform the competency as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

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Assessment will occur using industrial breathing apparatus and will be undertaken in a work-like environment.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

In accordance with AS/NZ 17151716, it is essential that competence is demonstrated in the ability to:

- appropriately conduct pre-donning tests
- correctly don breathing apparatus
- operate breathing apparatus
- move in conditions of reduced visibility
- use breathing apparatus in emergency procedures
- follow organisation procedures
- correctly remove breathing apparatus
- return breathing apparatus to operational status.

Assessment method and context

Competence in this unit may be assessed:

- by using an appropriate, industrial breathing apparatus and scenarios
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to breathing apparatus and associated equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

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The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to anyone required to wear breathing apparatus as part of their job.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of breathing apparatus, including:

- open circuit
- airline equipment.

Hazards

Typical hazards include:

- fire
- failure to maintain a face seal
- exhaustion of air supply
- malfunction of equipment
- disorientation in smoke/darkness or confinement
- structural hazards and/or hazardous materials
- entrapment.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'.

Variables

Key variables to be monitored for an irrespirable atmospheres include

- heated atmospheres
- asphyxiating atmosphere (oxygen deficient)
- (non-skin absorption) toxic or poisonous atmosphere
- smoke or suspended particles/fibres in atmosphere.
-

Unit Sector(s)

Not applicable.

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MSAPMOHS217A Gas test atmospheres

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit is about testing the working atmosphere to determine if it is safe for the proposed work. Testing involves the use of electronic test apparatus.

Application of the Unit

Application of this unit

In a typical scenario an individual may be required to carry out gas testing of an atmosphere prior to entering a specific area or workspace. The competency requires the person to interpret readings and take actions based on the interpretation.

This unit is modelled on the Public Safety unit PUAFIR307A Monitor hazardous atmospheres, but does not have the prerequisites, which are not required in the industrial context. The unit is more focused on the needs of that sector and has some wording changes.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Prepare for gas testing.	1.1 Determine type of gas/atmosphere to be tested. 1.2 Select and calibrate equipment in accordance with procedures. 1.3 Determine gas testing regime/sampling pattern required. 1.4 Identify hazards from possible atmosphere contaminants. 1.5 Implement hazard control measures, including use of appropriate personal protective equipment.
2. Test gas.	2.1 Use gas testing equipment to test gas as required. 2.2 Interpret and report readings. 2.3 Monitor gas on an ongoing basis as required. 2.4 Take required action(s) if readings are unacceptable.
3. Maintain equipment.	3.1 Clean and maintain gas testing equipment in accordance with procedures. 3.2 Inspect and fault find monitoring equipment in accordance with procedures. 3.3 Return gas testing equipment to required location and in required condition. 3.4 Maintain records of tests and results in accordance with procedures.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

As may be relevant to the plant/site/process, knowledge of the following may be required:

- common chemical asphyxiants, including hydrocarbons, carbon dioxide, carbon monoxide, hydrogen cyanide, and hydrogen sulphide
- common irritants and corrosives, including chlorine, ammonia and acid bases
- common flammable gases, including acetylene, petroleum, methane, ethane, propane and butane
- narcotics
- (explosive range, upper and lower explosive limits)
- exposure standards (time weighted average, short term exposure limits, peak limitation values, examination of toxic effect at the level of a range of flammable gases)
- conditions under which atmospheres become hazardous
- units of measurement used to express concentration of atmospheric contaminants (mg/cubic m. ppm, % v/v).

Underpinning skills could include interpretation and communication of results of sampling.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret a meter and then communicate the conclusions.

Writing is required to the level of completing required workplace reports/forms.

Numeracy read the instrument and interpret the results as being safe/not safe and so determine the required actions.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

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- apply personal safety principles
- interpret atmospheric conditions using atmospheric monitoring equipment
- recommend appropriate action
- maintain monitoring equipment.

Consistent performance should be demonstrated. For example, look to see that:

- gathered evidence covers a range of variables, all using different types of monitoring equipment.

Assessment method and context

Assessment will occur using industrial test equipment on an industrial site/plant and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- through written assignments
- by a demonstration activity using workplaces/atmospheres with detectable but safe levels of contaminants should be used
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

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Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

Working environment may be hazardous, unpredictable, subject to time pressure, chaotic and expose responders to risk, on land or water, by day or night.

Safety information and procedures must include relevant legislation, Australian Standards, codes of practice, manufacturer instructions and organisational procedures.

Situations include

- confined spaces
- enclosed and partially enclosed spaces
- storage tanks, silos, pits, pipes, shafts, ducts, transport vehicles and ships
- testing as part of issuing a work permit
- monitoring as part of working under a work permit
- open areas
- holding the gas tester by hand
- lowering the gas tester into a space, eg on a line.

Workplace atmospheres may

- include visible and invisible hazards
- include hazardous surfaces
- range from safe to unsafe.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

All operations to which this unit applies are subject to stringent Health, Safety and Environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Tools and equipment

This competency includes use of equipment and tools such as:

- portable instruments
- radiation detectors
- sampling tubes and pumps
- oxygen level meter
- carbon monoxide detector
- combustible gas detectors.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'.

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Unit Sector(s)

Not applicable.

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MSAPMOHS220A Provide initial First Aid response

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit deals with the provision of essential First Aid in recognising and responding to an emergency using basic life support measures.

Application of the Unit

Application of this unit

This competency applies to operators who have a First Aid role as part of their job. The 'first aider' is not expected to deal with complex casualties or incidents, but to provide an initial response where First Aid is required. In this unit it is assumed the 'first aider' works under supervision, either individually or as part of a team, and/or according to established workplace First Aid procedures and policies.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Assess the situation.	1.1 Identify physical hazards to own and others' health and safety. 1.2 Minimise immediate risk of hazard to self and casualty's health and safety in accordance with OHS requirements. 1.3 Assess the casualty's vital signs and physical condition in accordance with workplace procedures.
2. Apply basic First Aid techniques.	2.1 Provide First Aid management in accordance with established First Aid procedures. 2.2 Reassure and make casualty comfortable in a caring and calm manner using available resources. 2.3 Seek First Aid assistance from others in a timely manner and as appropriate. 2.4 Monitor and respond to casualty's condition in accordance with effective First Aid principles and workplace procedures. 2.5 Accurately record details of casualty's physical condition, changes in conditions, management and response to management in line with organisational procedures. 2.6 Finalise casualty management details according to casualty's needs and First Aid principles.
3. Communicate details of the incident.	3.1 Request medical assistance using relevant communication media and equipment. 3.2 Accurately convey details of casualty's condition and management activities to emergency

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	services/relieving personnel. 3.3 Prepare reports to supervisors in a timely manner, presenting all relevant facts according to established company procedures.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of basic life support measures sufficient to provide an initial response where First Aid is required within the scope of their responsibilities and competencies.

Knowledge and application of the Australian Resuscitation Council (ARC) guidelines.

The following knowledge should be demonstrated in assessment:

- basic anatomy and physiology
- company standard operating procedures (SOPs)
- legal responsibilities and duty of care
- dealing with confidentiality
- knowledge of the first aiders' skills and limitations
- Occupational Health and Safety legislation and regulations and requirements
- how to gain access to and interpret materials safety data sheets (MSDSs)
- First Aid management
- State and Territory workplace health and safety requirements
- allergies the casualty may have
- location and nature of the workplace
- the environmental conditions, eg electricity, biological risks, weather, motor vehicle accidents
- location of emergency service personnel
- the use and availability of First Aid equipment and resources
- infection control
- established First Aid principles, including:
    - checking the site for danger to self, casualty and others and minimising the danger
    - checking and maintaining the casualty's airway, breathing and circulation.

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Evidence should demonstrate the following skills:

- resuscitation
- demonstration of First Aid casualty management principles - assessing and minimising danger, maintaining the casualty's airway, breathing and circulation
- safe manual handling of casualty
- consideration of the welfare of the casualty
- report preparation
- communication skills
- ability to interpret and use listed documents.

Underpinning knowledge and skills:

- basic anatomy and physiology
- duty of care
- resuscitation
- bleeding control
- care of unconscious
- infection control
- airway management
- State/Territory regulatory requirements relating to currency of skills and knowledge
- decision-making
- legal requirements
- assertiveness skills
- communication skills.

Language, **literacy and numeracy requirements**

This unit requires the ability to communicate both verbally and in writing with relevant people regarding the casualty's condition and treatments initiated.

Writing is required to the level of completing required workplace forms and reports.

Numeracy is required to read, interpret and report numeric data relevant to the casualty and the treatments.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

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Assessment will occur using industrial treatment scenarios and will be undertaken in a work-like environment.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- work individually, under supervision or as part of a First Aid team.

Assessment method and context

Competence in this unit may be assessed:

- by using appropriate, industrial scenarios
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

In a major hazard facility, it may be appropriate to assess this unit concurrently with:

- PMPOHS200 Work safely
- PMASUP220 Monitor and control environmental hazards.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

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Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to people with a First Aid role.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- defibrillation units
- pressure bandages
- thermometers
- First Aid kits
- eyewash
- thermal blankets
- pocket face masks
- rubber gloves
- dressing
- spacer device
- cervical collars
- mobile phones
- satellite phones
- HF/VHF radio
- flags
- flares
- two way radio
- email
- electronic equipment
- medication which includes aerosol bronchodilators for asthma; casualty's own (or from First Aid kit) in accordance with State/Territory legislation, adrenaline for severe allergic reactions; subject to casualty's own regime.

Hazards

Typical hazards include:

- workplace hazards
- environmental hazards
- proximity of other people
- hazards associated with the casualty management process.

Problems

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'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'.

Variables

Key variables to be monitored include:

- vital signs, including breathing, circulation, consciousness.

Variables indicating the casualty's condition, including:

- abdominal injuries
- allergic reactions
- bleeding
- burns - thermal, chemical, friction, electrical
- cardiac conditions
- chemical contamination
- cold injuries
- crush injuries
- dislocations
- drowning
- envenomation - snake, spider, insect and marine bites
- environmental conditions such as hypothermia, dehydration, heat stroke
- epilepsy, diabetes, asthma and other medical conditions
- eye injuries
- fractures
- head injuries
- minor skin injuries
- neck and spinal injuries
- needle stick injuries
- poisoning and toxic substances
- respiratory management of asthma and/or choking
- shock
- smoke inhalation
- soft tissue injuries, including sprains, strains, dislocations
- substance abuse, including drugs
- unconsciousness, including not breathing and no pulse.

Risks

Risks may include:

- worksite equipment, machinery and substances
- environmental risks
- bodily fluids
- risk of further injury to the casualty
- risks associated with the proximity of other workers and bystanders.
-

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Unit Sector(s)

Not applicable.

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MSAPMOHS300A Facilitate the implementation of OHS for a work group

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

On completion of this unit, the worker will be able to implement and monitor defined OHS policies and procedures for a work group or area, within their scope of responsibilities.

Application of the Unit

Application of this unit

This competency applies to operators who are capable of coaching the team in participating and contributing to OHS management issues. The worker will be able to perform duties that are required of a safety committee member or safety representative in an organisation. Typically this worker might be a team leader or on the OHS committee.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has the prerequisite of *MSAOHS200A Work safely*.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Communicate OHS information for co-workers in team.	1.1 Accurately and clearly explain to the work group basic OHS rights, responsibilities and requirements. 1.2 Provide, in a readily accessible manner, information on the relevant organisation OHS policies, procedures and programs, and accurately and clearly explain them to the work group. 1.3 Regularly provide relevant information about identified hazards and the outcomes of risk assessment and risk control procedures, and accurately and clearly explain them to the work group.
2. Coach co-workers in team.	2.1 Establish mutual support groups, eg buddy system, to encourage effective development of individual and group competencies in OHS. 2.2 Provide personal encouragement and assistance to team members to contribute to the management of OHS at the workplace.
3. Facilitate the consultative process.	3.1 Deal with, and promptly resolve, issues raised through consultation or refer to the appropriate personnel for resolution in accordance with workplace procedures. 3.2 Seek input from work group on OHS issues and proposed changes to process, procedures or work place. 3.3 Encourage and use feedback from individuals and teams to identify and implement improvements in the

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	management of OHS. 3.4 Promptly inform the work group of the outcomes of consultation over OHS issues.
4. Implement and monitor organisation procedures for identifying hazards, and assessing and controlling risk.	4.1 Implement and monitor adherence to work procedures to identify hazards and assess and control risk. 4.2 Monitor existing risk control measures and report results regularly. 4.3 Access internal and external sources of relevant OHS information. 4.4 Evaluate and identify inadequacies in existing risk control measures in accordance with the hierarchy of control, and report to designated personnel. 4.5 Identify inadequacies in resource allocation for implementation of risk control measures and report to designated personnel. 4.6 Identify actual/potential inadequacies in procedures and report to designated personnel. 4.7 Identify actual/potential inadequacies in individual or team competency and report to designated personnel.
5. Maintain and use OHS records.	5.1 Accurately and legibly complete OHS records for work area, in accordance with workplace requirements for OHS records and legal requirements for the maintenance of records of occupational injury and disease. 5.2 Use aggregated information from the area OHS records to identify hazards and monitor risk control procedures within work area according to procedures and within scope of responsibilities and competencies.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

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Knowledge and understanding of the workplace OHS system and State OHS legislative requirements, codes of practice and relevant industry standards sufficient to implement and monitor OHS activities for a work group or area within the scope of their responsibilities and competencies.

In these industries which are characterised by high potential hazard, employees need to exercise their duty of care responsibilities not only within the general OHS Acts and regulations, but also within those State and national standards applying to hazardous substances, dangerous goods and major hazards.

Competence includes the ability to apply and describe the:

- identification of hazards in the workplace and standard controls
- assessment of risk and implementation of risk control measures
- rights and responsibilities of employees under OHS legislation
- obligations of employers under the OHS legislation
- legislative requirements for information and consultation
- arrangements for consultation within the workplace
- management systems and procedures for OHS
- the hierarchy of control
- hazard policies and procedures
- safety procedures
- emergency, fire and accident procedures.

Competence also requires the ability to:

- locate, understand and follow workplace OHS procedures
- identify and communicate with all key personnel in the organisation
- identify and access relevant sources of information
- interpret OHS data such as tables of numbers and graphs
- select, recommend and use personal protective clothing and equipment.

Language, **literacy and numeracy requirements**

This unit requires the ability to communicate with members of the work team/area and also management. It also requires the ability to interpret and apply OHS procedures and explain them to work team members.

Writing is required to the level of being able to keep records as required and also keep notes from meetings.

Numeracy is required to interpret incident statistics and hazard data.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

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Overview of assessment

The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations that will include disruptions to normal, smooth operation.

Where the assessee does not currently possess evidence of competency in *MSAOHS200A Work safely*, it may be co-assessed with this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- communicate effectively with the work group(s)
- proactively promote consultation and participation in the OHS processes
- participate in decisions which impact on OHS for their workgroup.

Consistent performance should be demonstrated. In particular look for knowledge and understanding of:

- specific hazard policies and the use of hazard procedures (eg identify, assess, control)
- the consultation processes, either general or specific to OHS
- OHS information
- OHS record keeping
- counselling, disciplinary and issue resolution processes.

These aspects may be best assessed using a range of scenarios/case studies/what ifs as the stimulus with a walk through forming part of the response. These assessment activities should cover a range of problems, including new, unusual and extreme situations that may have been generated from the past incident history of the workplace, incidents on similar plants around the world, hazard analysis activities and similar sources.

Assessment method and context

Assessment for this unit of competency will be on a processing plant or in a manufacturing environment.

Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays.

This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of 'what if' scenarios both in the workplace (during demonstration of normal operations and walk throughs of abnormal operations) and off the job.

It is expected that this competency may be applicable in combination with other industry, occupation or workplace-specific competencies. In all cases it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.

Specific resources for assessment

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Assessment will require access to an operating plant or manufacturing environment over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what ifs will be required as will a bank of questions that will be used to probe the reasoning behind the observable actions.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This unit describes OHS requirements applicable for all workers who are responsible for the organisation of OHS arrangements for a work group or area, including coaching.

It is expected that workers will be provided with clear directions, information, instruction, training and appropriate supervision regarding the relevant State/Territory OHS legislation, codes of practice, relevant industry standards, workplace procedures and work instructions.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Hazards

Typical hazards include:

- handling chemicals and hazardous materials
- chemical and or hazardous materials spillage
- gases and liquids under pressure
- moving machinery
- materials handling
- working at heights, in restricted or confined spaces, or in environments subjected to heat, noise, dusts or vapours
- fire and explosion.

Personnel

Appropriate personnel for OHS referrals may include:

- employer
- supervisor
- employees elected as OHS representatives

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- other personnel with OHS responsibilities.

Participative arrangements

Participative arrangements for OHS management may involve:

- making safety suggestions
- information sessions on existing or new issues
- meetings between employer and employees or representatives
- access to relevant workplace information
- use of clear and understandable language.

OHS Issues

OHS issues which may need to be raised by workers with designated personnel may include:

- recognition of hazards
- problems encountered in controlling risks associated with hazards
- clarification of understanding of OHS policies and procedures.

OHS Records

OHS records include:

- hazard and incident reports
- logs/logs sheets
- inspection/start up/shut down checklists
- injury reports
- maintenance records.

OHS Information Sources

Relevant sources of OHS information include:

- OHS legislation and codes of practice
- industry standards for materials, process, equipment etc
- SA/ISO standards
- OHS authorities
- unions and industry associations
- internet, journals, magazines
- manufacturer/supplier manuals/specifications
- policies and procedures
- JSA, risk assessments, HAZOPs
- hazard, incident and injury records
- training resources
- employee information brochures, newsletters etc
- OHS reports such as inspections, technical reports.
-

Unit Sector(s)

Not applicable.

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MSAPMOHS400A Contribute to OHS management system

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

On completion of this unit, the worker will be able to contribute to the workplace occupational health and safety (OHS) management system and ensure that the workplace is, so far as is practicable, safe and without risks to the health of workers.

Application of the Unit

Application of this unit

This competency applies to personnel who are required to implement, monitor and improve the OHS management system. It typically applies to an OHS expert, or a supervisor or manager who has OHS particular responsibilities.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has the prerequisite of *MSAOHS300A Facilitate the implementation of OHS for a work group*.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Establish and review procedures for identifying hazards, and assessing and controlling risk.	1.1 Access current, relevant information on legislative and industry requirements for hazard identification and risk assessment and control. 1.2 Identify gaps in procedures. 1.3 Develop workplace procedures to meet requirements. 1.4 Involve relevant stakeholders in procedures development. 1.5 Review the procedures on a regular basis by consulting stakeholder groups for feedback. 1.6 Inform relevant stakeholders and other work groups of any changes and implement changes in the procedures.
2. Establish and review incident procedures	2.1 Identify legal and organisation requirements. 2.2 Identify gaps in procedures. 2.3 Develop workplace procedures for dealing with incidents. 2.4 Review the procedures by consulting stakeholder groups for feedback. 2.5 Inform relevant stakeholders and other work groups of any changes and implement changes in the procedures.
3. Implement and review training program from an OHS perspective.	3.1 Identify the legal, organisational and practical requirements for OHS training. 3.2 Evaluate the workplace training program for OHS gaps.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	3.3 Review the program on a regular basis by consulting stakeholders and work groups for feedback. 3.4 Take appropriate action to incorporate relevant feedback into the revised program. 3.5 Inform relevant work groups of any changes and implement changes in the OHS training program.
4. Implement and review OHS recording system.	4.1 Identify the legal and organisational requirements for OHS records. 4.2 Evaluate the workplace OHS recording system for gaps. 4.3 Review the system on a regular basis by consulting stakeholders and work groups for feedback. 4.4 Incorporate relevant feedback into the revised system in consultation with stakeholders. 4.5 Inform relevant work groups of any changes and implement changes in the management of OHS record.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the workplace OHS system and State OHS legislative requirements, codes of practice and relevant industry standards sufficient to contribute to the workplace OHS management system for a work group or area within the scope of their responsibilities and competencies.

In these industries which are characterised by high potential hazard, team leaders and supervisors must be aware that employees need to exercise their duty of care responsibilities. This will be not only within the general OHS Acts and regulations, but also within those State and national standards applying to hazardous substances, dangerous goods and major hazards.

Competence includes the ability to apply and describe the:

- identification of hazards common to the industry and standard controls
- rights and responsibilities of employees under OHS legislation
- obligations of employers under the OHS legislation
- legislative requirements for information and consultation

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- legislative requirements for record keeping and reporting
- appropriate consultation arrangements for the industry
- numeracy, literacy and other communication skills of work group(s)
- duty of care of employers and employees
- hierarchy of control.

Competence also requires the ability to:

- access and use the current OHSMS
- access and interpret training records
- identify and communicate with all key personnel in the organisation
- identify and access relevant sources of information.

Knowledge of related management systems, eg purchasing and IT, is also required.

Language, **literacy and numeracy requirements**

This unit requires the ability to interpret and apply complex documents with specific technical jargon.

Writing is required to the level of drafting policy and procedures.

Numeracy is required to the level of interpreting statistics and hazard data and setting up appropriate safety measurements.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations that will include disruptions to normal, smooth operation.

Where the assessee does not currently possess evidence of competency in *MSAOHS300A Facilitate the implementation of OHS for a work group*, it may be co-assessed with this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- identify/describe the workplace OHS system and State OHS legislative requirements as well as the importance of critical procedures
- recognise and analyse potential situations that require action
- implement appropriate corrective action.

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There should be an underpinning understanding of the duty of care responsibilities of employer and employees.

Consistent performance should be demonstrated. For example, demonstrated knowledge and understanding of:

- all relevant workplace procedures
- the requirements that the workplace procedures should meet
- the consultation processes, either general or specific to OHS
- training and assessment of training needs
- hazard identification, risk assessment and risk control methods
- the need for specific hazard management policies and procedures
- types and sources of OHS information
- OHS record keeping systems
- the system for and process of maintenance of plant and equipment
- OHS issue resolution processes.

These aspects may be best assessed using a range of scenarios/case studies/what ifs as the stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and extreme situations that may have been generated from the past incident history of the workplace, incidents on similar plants around the world, hazard analysis activities and similar sources.

Assessment method and context

Assessment for this unit of competency will be on a processing plant or in a manufacturing environment.

Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays.

This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of 'what if' scenarios both in the workplace (during demonstration of normal operations and walk throughs of abnormal operations) and off the job.

It is expected that this competency may be applicable in combination with other industry, occupation or workplace-specific competencies. In all cases it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.

Specific resources for assessment

Assessment will require access to an operating plant or manufacturing environment over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies and 'what ifs' will be required as will a bank of questions that will be used to probe the reasoning behind the observable actions.

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Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This unit covers live, real time and ongoing routine hazard identification and risk assessment.

This unit describes OHS requirements applicable for those with responsibilities for contributing to the workplace OHS management system within a work group or area. This may be as a team leader or as a supervisor. Roles and responsibilities will vary from organisation to organisation.

Review of activities may include review of written reports, performance appraisal or auditing procedures.

Competence is demonstrated in the context of an organisation where the OHS system with related policies, procedures and programs is already established. The role will relate to the maintenance and upkeep of the system.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Hazards

Typical hazards include:

- handling chemicals and hazardous materials
- chemical and or hazardous materials spillage
- gases and liquids under pressure
- moving machinery
- materials handling
- working at heights, in restricted or confined spaces, or environments subjected to heat, noise, dusts or vapours
- fire and explosion.

OHS Information

Sources of relevant OHS information include:

- OHS legislation and codes of practice
- industry standards for materials, process, equipment etc
- SA/ISO standards
- OHS authorities

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- unions and industry associations
- Internet, journals, magazines
- manufacturer/supplier manuals/specifications
- policies and procedures
- JSA, risk assessments, HAZOPs
- hazard, incident and injury records
- training resources
- employee information brochures, newsletters etc
- OHS reports such as inspections, technical reports.
-

Unit Sector(s)

Not applicable.

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MSAPMOHS401A Assess risk

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

On completion of this unit, the worker will be able to identify hazards and operability problems and then analyse them by hazard analysis techniques to assess risk.

Application of the Unit

Application of this unit

A team with a broad knowledge of the system and its operation will carry out the analysis. It is expected that the risk assessment processes are already defined for the enterprise and that the risk acceptance criteria have already been established. The team will be steered by engineering experts or risk assessment specialists in the industry. This competency applies to workers who, in a typical scenario, take an active role in a HAZOP or similar methodology. They are not expected to lead the HAZOP. This unit is not restricted to HAZOPs and may be applied to other methodologies requiring similar competency. The risk assessment should be consistent with AS 4360 - Risk Management.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify hazards and potential operability problems.	1.1 Contribute to the compiling of a system description of all the machinery, equipment, operations, products and materials relevant to the everyday working procedures of the facility. 1.2 Contribute to the compiling of a checklist containing process parameters (primary key words) and guide words (secondary key words) relevant to the system. 1.3 Identify hazards, existing control measures and potential operability problems or breakdowns in control measures using the compiled system descriptions and the checklist.
2. Assess impact of risk and determine alternative strategies.	2.1 Screen for causes of deviations and establish consequences. 2.2 Determine alternative strategies for action in relation to each deviation within the range of competency and responsibility. 2.3 Review, clarify and/or analyse risk information to determine its relevance and reliability depending upon the task assigned, level of competency and area of responsibility.
3. Assess risk information against established risk criteria in risk management plan.	3.1 Check risk acceptance criteria for any changes over past period. 3.2 Compare risk information against risk acceptance criteria and procedures to assess acceptability of risk.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	3.3 Conduct liaison with other Internal departments to assess impact on business if applicable. 3.4 Document findings according to company policies and procedures.
4. Develop a risk register.	4.1 Develop a risk assessment chart for each system studied containing deviation, cause, consequence, control measures and action. 4.2 Develop action plan for implementation of control measures, including any changes to procedures. 4.3 Establish or review the procedures by consulting relevant/different work groups. 4.4 Inform relevant work groups of any changes and implement, within area of responsibility, changes in the procedures. 4.5 Monitor effectiveness of the control measures including revised procedures.
5. Establish and maintain procedures for identifying hazards, and assessing and controlling risk.	5.1 Identify and develop procedures for routine hazard identification, assessment and control of risks. 5.2 Address identification of all hazards at the planning, design and evaluation stages of any changes in the workplace to ensure that new hazards are not created by the proposed changes. 5.3 Develop and maintain procedures for selection and implementation of risk control measures in accordance with the hierarchy of control. 5.4 Identify inadequacies in existing risk control measures in accordance with the hierarchy of control and, within area of responsibility, promptly provide resources enabling implementation of new measures.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

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This unit requires the ability to apply a consistent risk assessment methodology which is appropriate to the workplace being assessed. One example of this is the HAZOP methodology, but other methodologies may be used.

Some understanding of quantitative risk assessment, such as HAZAN, is also required.

The requirements of the relevant OHS act and regulations with regard to risk assessment should be known and followed.

Knowledge includes:

- identification of hazards and how hazard controls may break down
- an understanding of risks and how they may be reduced
- the modelling and evaluation of a wide range of failure modes
- analysis which is auditable, repeatable, verifiable and usable by other staff
- analysis systems appropriate to the system operating in the given domain and appropriate for the particular life cycle phase at which it is to be applied
- determining valid results from data of the quality and quantity actually available
- use of standard pro-formas to support the technique
- a rational technical base which may include reference to national or international standards, defence standards or published reference books.

Language, **literacy and numeracy requirements**

This unit requires the ability to interpret process plant descriptions and drawings.

Writing is required to the level of making the required reports for the process.

Numeracy is required to interpret hazard and probability data and determine risk profiles.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Assessment will occur by analysing an appropriate industrial site and will be undertaken in a work-like environment.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

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- know and understand the workplace systems and the importance of critical procedures
- apply a working knowledge of all relevant workplace procedures.

Consistent performance should be demonstrated. For example, look to see that the techniques used:

- enable identification of hazards and how hazard controls may break down
- enhance the understanding of risks and how it may be reduced
- permit the modelling and evaluation of a wide range of failure modes
- enable the analysis to be carried out in a manner that is auditable, repeatable and verifiable
- are usable by other staff
- are appropriate to the system operating in the given domain
- give valid results from data of the quality and quantity actually available
- are appropriate for the particular lifecycle phase at which it is to be applied
- provide standard pro-formas to support the technique
- have a rational technical basis which may include reference to national or international standards, defence standards or published reference books.

These aspects may be best assessed using a range of scenarios/case studies and 'what ifs' as the stimulus with a walk through forming part of the response. These assessment activities should cover a range of problems, including new, unusual and extreme situations that may have been generated from the past incident history of the plant/equipment, incidents on similar plants around the world, past hazard analysis activities and similar sources.

Assessment method and context

Competence in this unit may be assessed:

- on an appropriate, industrial plant/site
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This unit will be completed as a specialist unit (eg by plant technicians) requiring technical knowledge.

The aim of this competency unit is to apply a methodical examination of the system and its elements to identify hazards and the states or conditions where there may be loss of control of the hazard and the resultant consequences The results of the hazard analysis should be expressed clearly and concisely, and include where possible tables and diagrams. Team members would contribute their understanding of the process and particularly the operational aspects, and then carry out whatever tasks are assigned to them by the analysis team.

While this competency aims to enable a person to identify hazards and assess risk through a systematic approach, more than 80% of recommendations can be operability problems and are not, of themselves, hazards. Although hazard identification should be the main focus, operability problems should be identified to the extent that they have the potential to lead to a breakdown in hazard controls resulting in a health, safety or environmental violation or have a negative impact on profitability.

The degree of depth of a checklist should be dependent on the knowledge of the system at the time the study is carried out. This technique can therefore be applied at any stage of the project/process lifecycle.

Screening for deviations includes accessing internal and external data that may provide information about previous incidents or warnings of incidents. Sources of such information may include:

- internal hazard and incidents reports, maintenance records, audit reports
- reports from similar plants, factories, industry bodies, regulators, journals etc of actual incidents or reports that have relevance to the situation being analysed.

Examples of risk assessment tools may range from relatively simple to more complex HAZOP analyses and other methodologies requiring similar competency.

Procedures

All operations are performed in accordance with procedures.

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Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Hazards

Typical hazards include:

- handling chemicals and hazardous materials
- chemical and or hazardous materials spillage
- gases and liquids under pressure
- moving machinery
- materials handling
- working at heights, in restricted or confined spaces, or environments subjected to heat, noise, dusts or vapours
- fire and explosion.

Problems

Typical process and product problems may include:

- incidents with a potential for injury
- fires, explosions
- chemical spills
- bomb scares.

Process Parameters

Specific process parameters (primary key words) relevant to the system may include:

- flow
- temperature
- pressure
- relief
- instrumentation
- sampling
- addition
- safety
- reaction
- reduce (grind, crush)
- absorb
- isolate
- vent
- start-up
- composition
- phase
- level
- corrosion
- erosion
- services

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- utilities
- maintenance/maintain
- inserting
- purging
- contamination
- separate (settle, filter, centrifuge)
- mix
- drain
- shutdown.
-

Unit Sector(s)

Not applicable.

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MSAPMOHS510A Manage risk

Modification History

Release 2 – updated to be consistent with ISO 31000:2009 Risk Management – Principles and Guidelines. Previous unit referred to Australian Standard (AS/NZS 4360:1999). Reformatted - Equivalent.

Unit Descriptor

This unit covers the development, implementation and evaluation of an organisation-wide risk management plan. It incorporates an assessment of all potential risks facing the organisation and the approach, the management components and resources to be applied to the management of risk.

Application of the Unit

This unit applies to managers or work health and safety (WHS) specialists who are developing or maintaining a risk management plan for their site or organisation. This unit is based on ISO 31000:2009 Risk Management – Principles and Guidelines, and as such may be applied quite broadly. However, it is probably best applied to health, safety and environment risks and the business and other risks consequent on them.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSAPMOHS401A Assess risk

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

1	Develop risk management plan	1.1	Analyse and interpret strategic position and policy on risk management
		1.2	Identify risk management context and potential areas of risk
		1.3	Analyse organisational capability to manage risk and achieve objectives
		1.4	Generate a comprehensive list of risks that could affect the achievement of the organisation’s objectives
		1.5	Establish or review risk management policies
		1.6	Evaluate the requirement for training/education for all groups and individuals
		1.7	Identify access to external specialist assistance
		1.8	Establish appropriate risk assessment techniques
		1.9	Consult stakeholders in the development of the plan
2	Implement risk management plan	2.1	Define, in consultation with stakeholders, the criteria used to evaluate the significance of risk
		2.2	Evaluate and prioritise risks for treatment
		2.3	Determine and select the most appropriate options for treating risks
		2.4	Implement and monitor risk treatment plan
		2.5	Document strategies for risk treatment options

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3	Evaluate risk management plan	3.1	Establish procedures to regularly review risk management activities
		3.2	Ensure stakeholders have input to the review
		3.3	Examine activities that do not achieve their objective/ performance outcomes to determine cause
		3.4	Identify targets for improvement and update plan
		3.5	Establish evaluation of risk management as a key component of all projects/activities

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- the ability to communicate high-level material using all modes of communication to all levels
- writing to the level of writing reports, policies and procedures
- numeracy to interpret and manipulate technical data

Required knowledge

The person must demonstrate understanding of specialised knowledge with depth in some areas. Required knowledge is to be limited to that which is sufficient to perform particular risk management functions. Competence includes the ability to apply and explain:

- AS/NZS ISO 31000:2009 Risk Management - Principles and Guidelines
- relevant legislation from all levels of government that effects business operation, especially in regard to WHS and environmental issues, equal employment opportunity (EEO), industrial relations and anti-discrimination
- the legal implications of deeming identified risks as acceptable
- strategic, tactical and operational plans of the organisation
- legal requirements for operating the business relevant to the area of responsibility
- relevant awards and industrial agreements
- workplace standards for WHS and environmental management
- internal or external audit methods
- focus group processes
- risk analysis processes

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- investigation reports
- review of data, such as risk and incident reports, maintenance records and production records

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria required skills and knowledge range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A holistic approach should be taken to the assessment. Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to: • develop, implement and evaluate the development of plans to eliminate, isolate or protect people (and/or equipment) in the event of a potential negative event occurring. The emphasis should be on the ability to avoid/eliminate critical incidents rather than on recovery from a disaster. These aspects may be best assessed using a range of scenarios/case studies/what ifs as the stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and extreme situations that may have been generated from the past incident history of the workplace, incidents on similar plants around the world, hazard analysis activities (e.g. HAZOP) and similar sources.
Context of and specific resources for assessment	Assessment will occur in an industrial site/plant and will be undertaken in a work-like environment. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method.

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	Questioning may take place either in the workplace, or in an adjacent, quiet facility, such as an office or lunchroom. No other special resources are required. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	Competence in this unit may be assessed: • on an appropriate, industrial plant/site • in a situation allowing the generation of evidence of the ability to respond to problems • by using a suitable simulation and/or a range of case studies/scenarios • through a combination of these techniques. In all cases it is expected that practical assessment will be combined with targeted questioning to assess the required knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.
Guidance information for assessment	Assessment processes and techniques must be appropriate to the language, competency and safety requirements of the organisation and consistent with workplace systems or procedures.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Context	Risk management is defined as coordinated activities to direct and control an organisation with regard to risk. The risk management plan should specify the approach, the management components and resources to be applied to the management of risk.
External specialist assistance	External specialist assistance may include but is not

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	limited to any group or individual in the community who has the expertise to assist the organisation to deal with any event/incident which may occur.
Risk	Risk is the effect of uncertainty on objectives. Risk may include but is not limited to: • injury or disease • environmental factors • product failure • financial/economic loss/failure • damage to property/plant/equipment • industrial disputes • professional incompetence • natural disasters • security failure (including criminal or terrorist activities) • equipment/system failures • political events
Appropriate options for treating risks	Appropriate options for treating risks may include but are not limited to: • compatibility with organisation policy • feasibility of implementing • validity of proposed treatment
Legislation	Legislation, codes and national standards relevant to the workplace may include: • award and organisation agreements and relevant industrial instruments • relevant legislation from all levels of government that affects business operation, especially in regard to WHS, environmental issues, equal employment opportunity (EEO), industrial relations and anti-discrimination • relevant industry codes of practice
Procedures	All operations are performed in accordance with procedures. Procedures include: • all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards
Health, safety and environment (HSE)	All operations to which this unit applies are subject to stringent HSE requirements, which may be imposed through state or federal legislation, and these must not be compromised at any time. Where there is an

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apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Not applicable.

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MSAPMOHS503A Maintain the workplace OHS management system

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the ongoing maintenance of the OHS management system (OHSMS) within the area of managerial responsibility, in order to ensure that the workplace is, so far as is practicable, consistently safe and without risks to the health and safety of employees. It assumes that the OHSMS has been developed by persons with the relevant specialist knowledge and skills.

Application of the Unit

Application of this unit

This competency applies to personnel with a specialised responsibility for maintaining the workplace OHSMS. This will typically be a manager, team leader or a technician with particular OHS responsibilities. The work will be carried out with the support of other team members.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.
1. Manage OHS information in the workplace	1.1 Take action to ensure that requirements for OHS record keeping and reporting are implemented according to workplace procedures and legislative requirements. 1.2 Access sources of OHS information and evaluate for application to the workplace. 1.3 Collect and collate data and information to provide information to managers and stakeholders on OHS requirements, trends and risk controls.
2. Support implementation of OHSMS	2.1 Determine OHS priorities in consultation with appropriate managers and stakeholders. 2.2 Identify OHS training needs for implementation and maintenance of the OHSMS. 2.3 Develop action plans taking account of priorities and training needs. 2.4 Monitor achievement of action plans and update plans accordingly.
3. Support OHS participative arrangements	3.1 Ensure OHS information and documentation is understandable and accessible to all. 3.2 Promptly address OHS issues that may arise within area of authority or refer to appropriate person. 3.3 Provide information about the outcomes of OHS consultation in a manner that is accessible to all.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.
4. Collect data to evaluate currency of OHSMS.	4.1 Identify, in consultation with stakeholders and, as required expert advisors, internal data and information that provides relevant and reliable information on the performance of the OHSMS. 4.2 Conduct workplace inspections on a regular basis. 4.3 Identify workplace OHS implications of any changes to legislation. 4.4 Identify any OHS implications to proposed changes to the workplace. 4.5 Take action to arrange an OHSMS audit.
5. Analyse data and information to identify areas for improvement	5.1 Assess compliance of OHSMS with OHS legislation. 5.2 Analyse information collected to identify areas for improvement. 5.3 Consult with stakeholders, key personnel and, as required, OHS advisors. 5.4 Document and communicate outcomes of analysis to key personnel and stakeholders in an easily understood format. 5.5 Recognise limits of own expertise and seek appropriate advice.
6. Initiate and maintain improvements.	6.1 Determine priorities for OHS in consultation with stakeholder. 6.2 In consultation with stakeholders, develop an OHS plan with responsibilities and time frames. 6.3 Identify and source resources required for implementation of plan. 6.4 Monitor achievement against plan. 6.5 In consultation with stakeholders, monitor effectiveness of modifications to OHSMS on an ongoing basis.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

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Knowledge and understanding of the workplace OHSMS and State OHS legislative requirements, codes of practice and relevant industry standards sufficient to maintain, evaluate and improve the workplace OHS management system within the scope of their responsibilities and competencies.

Management must be aware that, while employees have OHS responsibilities, line managers are ultimately responsible, under both OHS legislation and common law duty of care, for the safety of the workplace, including ensuring that employees comply with documented work procedures. This legislation includes general OHS legislation as well as that for hazardous substances, dangerous goods and major hazard sites.

Competence in this unit includes the ability to apply a working knowledge of the workplace, relevant OHS legislation and OHSMS to:

- maintain an OHSMS already defined and established
- identify types of data and information that will provide information on the effectiveness of the OHSMS in minimising risk
- analyse the data to identify areas for improvement in elements of the OHSMS, including communication and consultation, reporting and hazard identification, risk assessment and risk control,
- develop strategies for improvement in the OHSMS
- apply the hierarchy of control to recommend actions to minimise risk
- OHS record keeping and reporting as required under:
- hazardous substances and dangerous goods legislation
- OHS legislative requirements to report serious incidents and injuries and keep records of risk assessments
- creation and management of other record such as:
- hazard and incident reports, investigation reports
- completed workplace inspection checklists and reports
- external or internal reports
- minutes of meetings.

Language, **literacy and numeracy requirements**

This unit requires the ability to communicate in all modes and at all levels conveying what is often technical content/ideas.

Writing is required to the level of writing the required reports and documents.

Numeracy is required to interpret and manipulate the necessary data.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

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A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Assessment will occur on an industrial site and will be undertaken in a work-like environment.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- interact with the workforce to maintain the process that comprise the OHSMS
- access and analyse information to identify areas for improvement
- develop appropriate improvement strategies
- apply a quality improvement process to implement and monitor change

Consistent performance should be demonstrated. For example, look to see thatthe required level includes a working knowledge of the workplace OHSMS. Look to see knowledge and understanding of:

- OHS responsibilities of all levels in the workplace
- the consultation processes, either general or specific to OHS
- hazard identification and risk assessment
- implementation of risk control measures by applying the hierarchy of control
- new and relevant OHS information
- OHS record keeping
- OHS issue resolution legislative requirements for consultation prior to the implementation of change
- sources and types if information that provide realistic information on the performance of the OHSMS
- techniques for analysing OHS data, including simple statistical analysis and graphing of trends
- types of internal and external change that may impact on OHS.

These aspects may be best assessed in a realistic workplace. Where this is difficult to access then steps should be taken to arrange access to realistic data and a visit to a workplace. Scenarios and case studies may provide a suitable adjunct. These assessment activities should include a range of problems that may be encountered when maintaining reviewing and implementing improvement to the OHSMS.

Assessment method and context

Competence in this unit may be assessed:

- on an appropriate, industrial plant/site
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

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In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This unit describes OHS requirements applicable for those with managerial responsibilities for maintaining and improving an established OHSMS within the organisation. This may be as a worker or as an owner of a business. This competency assumes that the OHSMS has been established by others, either internal or external and that expert advice is available either internally or externally.

The competency is to be exhibited within the area of managerial responsibility, which may be an entire organisation or department of an organisation. Roles and responsibilities will vary from organisation to organisation.

While relevant positions for maintaining and improving the OHSMS will include managers, OHS officers/managers it should be quite clear that the legal responsibility for OHS rests with the line managers.

Analysis of data may include statistical analysis, qualitative analysis or informal review.

Procedures

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All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Hazards

Typical hazards include:

- handling chemicals and hazardous materials
- chemical and or hazardous materials spillage
- gases and liquids under pressure
- moving machinery
- materials handling
- working at heights, in restricted or confined spaces, or environments subjected to heat, noise, dusts or vapours
- fire and explosion.

OHS Information Sources

Sources of OHS information may be external and include:

- OHS legislation, codes of practice and Australian and International standards
- OHS regulators and Australian Safety and Compensation Council (ASCC)
- industry bodies
- Internet sites, journals and newsletters
- OHS policies and procedures
- manufacturer manuals
- risk assessments, JSAs, workplace inspections
- MSDSs and registers
- hazard and incident reports.
-

Unit Sector(s)

Not applicable.

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MSAPMOHS601A Establish workplace OHS management system

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit covers the establishment and maintenance of the OHS management system (OHSMS) at the senior management level, in order to meet legislative requirements and to ensure that the workplace is, so far as is practicable, safe and without risks to the health of employees.

Application of the Unit

Application of this unit

This competency applies to managers and senior technicians who have an OHS responsibility. It typically applies when an OHSMS is being established, but could be used for a complete review of an existing OHSMS.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has the prerequisite of *MSAOHS503A Maintain the workplace OHS management system*.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify needs of the OHSMS	1.1 Analyse the workplace to identify needs and workplace factors that may impact on the design of the OHSMS. 1.2 Clarify OHS legal obligations in relation to the specific workplace. 1.3 Review relevant standards relating to OHSMS. 1.4 Identify links with other functional areas and management systems. 1.5 Seek input from stakeholders on the design of the OHSMS.
2. Establish the framework for the OHSMS	2.1 Ensure OHS responsibilities and duties are documented and accountability processes are in place. 2.2 Identify and source financial and human resources required for the operation of the OHSMS. 2.3 Establish or review OHS policies and procedures. 2.4 Ensure implications of any proposed changes to the workplace are identified and addressed. 2.5 Recognise limits of own professional expertise and consult OHS specialists as necessary.
3. Establish and maintain participative arrangements for the management of OHS.	3.1 Establish and maintain appropriate participative processes with employees and their representatives in accordance with relevant OHS legislation and industry standards. 3.2 Provide information on OHS to employees in a format that is readily accessible and understandable.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	3.3 Promptly and effectively deal with and resolve issues raised through participation and consultation in accordance with procedures for issues resolution. 3.4 Provide information about the outcomes of participation and consultation in a manner accessible to employees.
4. Establish and maintain risk management processes	4.1 Establish or review procedures for hazard, incident and injury reporting and investigation. 4.2 Establish or review procedures for hazard identification, hazard analysis and risk assessment. 4.3 Establish or review hazard specific risk control measures currently in place to meet legal requirements and minimise risk as far as is practicable. 4.4 Establish or review procedures for on going control of identified hazards and monitoring of the effectiveness of controls.
5. Establish and maintain an OHS training program.	5.1 Conduct an OHS training needs assessment for the workgroup that takes account of legislative requirements, internal policies and procedures, skills of workgroup and risk control requirements. 5.2 Develop and implement an OHS training program to identify and fulfil employee's OHS training needs as a part of the organisation general training program. 5.3 Coordinate with relevant training experts as necessary.
6. Establish and maintain a system for OHS records.	6.1 Identify and address legal requirements for record keeping and reporting. 6.2 Identify and access sources of OHS information. 6.3 Take actions to ensure that records are accurately completed, collected and stored.
7. Implement OHS systems, strategies and plans	7.1 Determine OHS priorities in consultation with managers and taking account of participative arrangements in the workplace. 7.2 Develop plans for the implementation of OHS strategies. 7.3 Monitor and update plans for achievement as

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	required.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the workplace OHSMS and State OHS legislative requirements, regulations, codes of practice and relevant industry standards, sufficient to establish and maintain the OHSMS within the scope of their responsibilities and competencies.

In these industries which are characterised by high risk hazards, it is vital that the overarching legal responsibility of managers is recognised in relation to the establishment and implementation of the OHSMS, including ensuring the compliance of operators with established policies and procedures. The responsibility applies not only within the general OHS Acts and regulations, but also within the legislation and national and industry standards applying to hazardous substances, dangerous goods and major hazards.

Competence includes the ability to apply a working knowledge of:

- all relevant State/Territory OHS legislation particularly as it relates to the roles and responsibilities of employers and employees, including supervisors and contractors, requirements for information and consultation and processes and arrangements to met these obligations, requirements for OHS record keeping and reporting and requirements for training and licensing
- elements of an OHSMS and principles and practices of effective OHS management and risk control, OHSMS requirements of other functional area and management systems including business planning, purchasing, maintenance, contractors, training
- barriers to implementation of OHS, including language and literacy, cultural diversity of workforce and workplace culture in relation to OHS
- codes of practice, relevant industry standards, workplace procedures and work instructions
- apply the hierarchy of control to develop risk control procedures.

Language, **literacy and numeracy requirements**

This unit requires the ability to communicate technical information at all levels and using all modes of communication.

Writing is required to the level of writing reports, policies and procedures.

Numeracy is required to interpret and manipulate technical data.

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Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Where the assessee does not currently possess evidence of competency in *MSAOHS503A Maintain the workplace OHS management system*, it may be co-assessed with this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that the OHS issues and workgroup dynamics are understood together with the required OHS knowledge in order to frame and implement an OHSMS that is practical and relevant to the workplace. It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- develop appropriate documentation
- consult and negotiate to implement the policies and procedures
- apply a systematic process to planning and implementation.

Consistent performance should be demonstrated. For example, the required level includes a working knowledge of the OHSMS as it applies in the specific workplace. Look to see knowledge and understanding of:

- OHS responsibilities of all levels in the workplace
- the consultation processes, either general or specific to OHS
- training and assessment of training needs
- hazard identification and risk assessment
- implementation of risk control measures by applying the hierarchy of control
- the need for specific hazard policies and procedures
- new and relevant OHS information
- OHS record keeping
- the system/routine for maintenance of plant and equipment
- the system for purchasing of supplies and equipment
- OHS issue resolution processes.

These aspects are best assessed in the actual workplace and work group however they may also be assessed as a review process in a sample workgroup accessed for the purpose of the assessment supported by a range of scenarios/case studies.

Assessment method and context

Assessment will occur on an industrial site/plant and will be undertaken in a work-like environment.

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Competence in this unit may be assessed:

- on an appropriate, industrial plant/site
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This unit of competency describes OHS requirements applicable for those with managerial responsibilities for establishment and ongoing management of the occupational health and safety management system within the organisation. This may be as a worker or as an owner of a business.

The competency is to be exhibited within the area of managerial responsibility, which may be an entire organisation or department of an organisation. Roles and responsibilities will vary from organisation to organisation.

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Competence is demonstrated in the context of an organisation where the OHS system with related policies, procedures and programs may or may not be established. Where the OHS system is established, the role will relate to the review of the OHSMS.

Workplace factors that may impact on the design of the OHSMS include:

- whether certification is required
- organisational structure
- management commitment
- management style and OHS knowledge and skills of managers
- workplace culture, including industrial relations and safety culture
- communication and consultation processes
- other management systems requiring interface or integration with the OHSMS
- resources available
- nature of hazards and level of risk
- staff profile, including language, literacy and numeracy, workplace ethnic and cultural diversity, special needs for employees.

Other functional areas\and management systems may include:

- strategic planning
- purchasing, procurement and contracting
- logistics
- HR and personnel management, including payroll
- engineering and maintenance
- information and records management
- finance and auditing
- environmental management
- quality management.

Relevant standards relating to OHS may include:

- Australian standards
- standards developed by OHS authorities
- industry standards
- standards developed by commercial organizations.

Legal requirements for record keeping will include requirements under:

- hazardous substances and dangerous goods legislation, including requirements to keep registers
- OHS and environmental legislation to report serious incidents and injuries, keep records of risk assessments.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Hazards

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Typical hazards include:

- handling chemicals and hazardous materials
- chemical and or hazardous materials spillage
- gases and liquids under pressure
- moving machinery
- materials handling
- working at heights, in restricted or confined spaces, or environments subjected to heat, noise, dusts or vapours
- fire and explosion.

Problems

Typical process and product problems may include:

- incidents with a potential for serious injury
- fires and explosions
- chemical spills
- bomb scares.

OHS Information Sources

Sources of OHS information may be external and include:

- OHS legislation, codes of practice and Australian and International standards
- OHS regulators
- industry bodies
- internet sites, journals and newsletters

Internal sources of OHS information include:

- OHS policies and procedures
- manufacturer manuals
- risk assessments, JSAs, workplace inspections
- MSDSs and registers
- hazard and incident reports.
-

Unit Sector(s)

Not applicable.

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MSAPMOPS100A Use equipment

Modification History

Release 2 – Minor clarification changes to application and range, and minor editorial corrections.

Unit Descriptor

This unit covers the use of any item of equipment which is operated with limited application of knowledge.

Application of the Unit

This unit applies to all persons who have the responsibility for using equipment where they are not required to have any significant understanding of the equipment or the process.

In a typical situation the operator may be using, for example, a packaged chilled water refrigeration unit to supply chilled water to the plant. The operator uses simple controls and responds to fault alarms built into the equipment. Even though the equipment may be very sophisticated (e.g. using high-speed compressors and computerised monitoring and control equipment) the operator interface is relatively simple. The operator is expected to simply regard this equipment as a black box – they may know what it does, but little detail on how it does it.

This unit applies to an individual working alone or as part of a team or group and working in liaison with other shift team members and the control room operator, as appropriate.

Where greater levels of understanding and interaction are required, then the appropriate 200 series technical unit should be used.

This unit has been written to apply to fluids as well as solids and may be applied wherever ‘black box’ equipment is used.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

This unit has **no** prerequisites.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

1. Follow workplace procedures	1.1 Find out what is required for the job 1.2 Identify and follow appropriate procedures 1.3 Complete all reporting as required 1.4 Recognise and report anything unusual
2. Monitor and use the equipment/process	2.1 Turn the equipment on and off as required by procedure 2.2 Monitor equipment throughout the job using measurements, readings and senses as appropriate 2.3 Recognise deviations from standard/desired conditions 2.4 Take appropriate corrective action

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Minimal knowledge of the equipment and procedures but sufficient to recognise abnormal operating conditions and alert the appropriate individuals.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- describe appropriate safety procedures concerning the operation of the equipment, procedures relating to the reporting of hazardous conditions, and appropriate shutdown procedures
- recognise a situation requiring action and take the action specified in the procedures, and report the situation as specified in the procedures.

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Language, literacy and numeracy requirements

This unit has minimal literacy and numeracy requirements other than those required to start and stop the equipment and recognise common problems (e.g. reading gauges).

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- use the equipment for the specified purpose
- operate the equipment within the prescribed operating limits
- identify when the equipment is not operating as prescribed
- correctly monitor the equipment's operation
- report equipment malfunctions or problems according to procedures.

Consistent performance should be demonstrated. For example, look to see that:

- standard procedures are followed
- deviations from desired conditions are recognised
- action specified in the standard procedures is carried out
- work is carried out safely.

Assessment method and context

Assessment will occur on an appropriate item of equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- on a processing plant allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

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	In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions. Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.
Specific resources for assessment	This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Standards and codes	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This competency applies to operators new to the job or operators at any level using equipment where significant understanding of the equipment or process is not required. It applies to any item of equipment which may be used in any sector. It may include: • compressors (packaged plant) • refrigeration (packaged plant) • fans • blowers • portable generators • air conditioning units

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- other equipment with similar operating requirements

Packaged plant Packaged plant includes:

- all items of equipment which come in a 'ready to use' form, and are often skid mounted, portable or designed for use by untrained and inexperienced people

Procedures All operations are performed in accordance with procedures.

Procedures mean all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Hazards Typical hazards include:

- rotating components
- drive chains or belts
- hot or cold equipment parts
- dust, vibration, noise or fumes
- oil spills
- fuel leaks

Corrective action Taking appropriate corrective action includes:

- reporting to the appropriate people or such other specific actions which have been previously defined for specific occurrences

Variables Key variables to be monitored include:

- equipment production outputs
- equipment operating conditions
- operating temperatures and pressures

Unit Sector(s)

Not applicable.

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MSAPMOPS101A Make measurements

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit covers the making or taking of measurements in a variety of sites and locations.

Application of the Unit

Application of this unit

This unit applies to people who are required to apply basic knowledge and skills in performing routine measurements for industry related operations. It is typically performed by people working either independently or as part of a work team.

The worker will:

- make measurements using physical and/or chemical measuring equipment
- record results using either a manual or computer system
- identify problems and take required action
- complete logs and reports.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify appropriate measurements.	1.1 Select appropriate measuring equipment. 1.2 Identify units to be used, and the detail required. 1.3 Check measuring equipment is in calibration.
2. Perform measurements	2.1 Explain range of results that may be obtained 2.2 Identify and take account of relevant external factors. 2.3 Perform measurements using appropriate techniques 2.4 Compare measurements against the range of expected results 2.5 Self-check numerical information for accuracy and correctness. 2.6 Explain the need for calibration and use calibrated equipment to make measurements.
3. Record measurements as required.	3.1 Accurately record the result in the appropriate format. 3.2 Record the result to the appropriate level of detail.
4. Respond to routine problems in accordance with procedures	4.1 Recognise known faults that occur during the measurement. 4.2 Identify and take action on causes of routine faults. 4.3 Log problems as required. 4.4 Identify non-routine problems and report to

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	designated person.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the process sufficient to recognise non-standard situations and then determine appropriate action which is consistent with operating guidelines. For example, in gel coating, a coating less than 5 mils thick may wrinkle, especially when brush marks are present. Thickness is checked using a gel coat thickness gauge.

Knowledge and the ability to implement the organisation's procedures and relevant regulatory requirements, within appropriate time constraints and work standards.

Application of approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup.

Knowledge in measurement sufficient for consistent performance to specifications including:

- basic units of measurement (eg kilogram, metre, second)
- correct selection and use of measuring devices
- application of relevant mathematical calculations and procedures, including additions, subtractions, division, fractions, percentages
- use of dial, scale and digital readouts
- the need for calibration and methods of checking equipment is within calibration.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of basic arithmetical manipulations and the interpretation of the significance of numbers and variations of readings.

Evidence Guide

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to

- take accurate measures using the appropriate measuring device
- apply approved procedures.

Consistent performance should be demonstrated. For example, look to see that

- standards in taking measurements are met consistently
- all safety procedures are followed.

Assessment method and context

Assessment will occur over a range of situations requiring the taking of measurements and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- by observation or questioning to indicate understanding and knowledge
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

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Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all routine measurements within a manufacturing environment.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- measuring devices, including gauges, dip-sticks, thermometers, weighing scales, length/thickness measuring
- calculators
- computers for recording results
- relevant personal protective equipment.

Hazards

Typical hazards include:

- dusts/vapour
- temperature
- hazardous substances
- manual handling hazards.

Problems

Respond to routine problems means 'apply known solutions to a limited range of predictable problems'.

Typical problems may include:

- measuring instrument not fit for use (eg not within calibration)
- appropriate measuring device not available
- deviations from normal range of readings
- effect of temperature on material properties.

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Appropriate action for non-routine problems may be reporting to designated person or other action specified in the procedures.

Variables

Key variables to be monitored include:

- extent
- dimension
- quantity
- mass
- capacity
- capability.
-

Unit Sector(s)

Not applicable.

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MSAPMOPS102A Perform tasks to support production

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the performance of largely manual tasks that are performed in support of the production process working under close supervision. It applies to all sectors of the industry.

Application of the Unit

Application of this unit

This competency applies to operators who are not operating equipment but are making product and contributing to the production process. It might also apply to a more experienced operator working outside their field of expertise and under close supervision. This competency is typically performed by all operators working either independently or as part of a work team.

It includes:

- 'fetch and carry' type tasks
- making product under close supervision but not operating process equipment (see *MSAPMOPS100A Use equipment*), following safe working procedures and using personal protective equipment.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Perform general cleaning duties.	1.1 Clarify cleaning duties. 1.2 Select and use personal safety equipment, where needed, in accordance with organisation procedures. 1.3 Determine, prepare and mix appropriate cleaning equipment and chemicals/detergents for specific tasks. 1.4 Follow procedures for handling and storage of cleaning liquids in accordance with organisation or manufacturer specifications. 1.5 Clean as required.
2. Perform general duties and tasks.	2.1 Perform tasks as directed. 2.2 Ask questions of appropriate person to confirm unusual requirements. 2.3 Organise relevant equipment and tools and check to confirm good working condition.
3. Transfer, remove or supply materials/ product where required	3.1 Organise, confirm and record requests and tasks according to specified procedures. 3.2 Identify and organise appropriate equipment for transferring material where relevant.

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	3.3 Load and unload material using suitable aids. 3.4 Transfer/move material to the correct destination in a safe manner.
4. Complete documentation accurately.	4.1 Complete documentation for tasks, where relevant, accurately in accordance with required organisation procedures.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Required knowledge and skills include:

- machine and equipment operation
- procedures to handle products and materials
- use of products and materials
- quality requirements
- relevant OHS legislation, codes of practice, policies and procedures
- maintenance planning and workplace procedure
- reporting procedures
- loading and unloading materials
- applying all relevant safety practices
- use and disposal of a range of chemical cleaning agents, sealants and lubricants, where required
- communicating effectively within the workplace
- interpreting and applying established procedures
- documenting and transferring information.

Language, **literacy and numeracy requirements**

This unit has minimal literacy and numeracy requirements other than those required to carry out the job (eg recognise labels and signs).

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Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- undertake basic production tasks
- handle material and products
- locate and transport materials and products
- clean equipment, machines and work environment
- document work and maintain records as required
- apply workplace heath and safety policies in work operations.

Consistent performance should be demonstrated. For example, look to see that production standards are met consistently.

Assessment method and context

Assessment will occur in a work-like environment.

Competence in this unit may be assessed:

- on a processing plant allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

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This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all operators working either independently or as part of a work team.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include:

- original manufacturer instructions and guidelines for the use of any equipment
- relevant procedures relating to safe working practices prescribed for the equipment
- local OHS legislation and/or Regulations
- site specific instructions based on production requirements.

Tools and equipment

This competency includes use of equipment and tools such as:

- cleaning equipment
- detergents and other chemicals hand and power tools
- hand trolleys pallet trucks
- but not more complex equipment such as forklifts, overhead cranes, or front end loaders.

Loading and unloading aids

Loading and unloading aids include various types of equipment other than regulated load shifting equipment and must conform to materials handling requirements, safe work practices and manual handling techniques, and workplace procedures

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Hazards

Typical hazards include:

- slips, trips and falls
- manual handling injuries
- dust, dirt and vapours
- cuts and abrasions
- lack of knowledge of machine operation.

Problems

'Simple problems' means 'apply defined solutions to a narrow range of previously specified problems'.

Typical process and product problems may include:

- difficult access to the work area
- awkward work spaces
- tool failures or breakages
- defective equipment
- incorrect or defective materials
- wrong quantities of materials.

Variables

Key variables to be monitored include:

- atmospheric conditions (weather)
- condition of the work area
- placement of products or materials used in the production process
- lighting
- types of aids to production being used.
-

Unit Sector(s)

Not applicable.

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MSAPMOPS200A Operate equipment

Modification History

Release 2 – Minor clarifications to application and range, and minor editorial corrections.

Unit Descriptor

This unit covers the skills and knowledge needed to operate a plant item/unit of equipment and the resolving of routine problems in accordance with procedures. This competency is for units of equipment/plant items which are not otherwise covered in this Training Package and may be organisation specific.

Application of the Unit

This unit applies to a person who has the responsibility for undertaking the routine operation of an individual unit of equipment or a plant item. The key factors are operating to organisation requirements, meeting quality standards and other workplace requirements. The type of people to whom this unit may apply include (but are not limited to):

- plant operators.

This unit applies to an individual working alone or as part of a team or group and working in liaison with other shift team members and the control room operator as appropriate.

This unit applies:

- typically to ‘outside’ or ‘field’ operators, but may also apply to
- ‘panel’ or ‘control room’ operators.

This unit requires a detailed knowledge about the unit being operated and some knowledge about related units and processes.

This unit has been written to apply to both fluid and solids processing units. It does not include the operation of any packaged unit which only requires operation as a ‘black box’ (regardless of its engineering complexity) which is covered by MSAPMOPS100A Use equipment.

If several units are combined to form a unit which must be operated as an integrated unit then please see PMAOPS300B Operate a production unit.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

This unit has **no** prerequisites.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

1	Check work requirements	1.1	Identify work requirements from work plan or request
		1.2	Check product, materials and equipment meet requirements for job(s)
		1.3	Recognise requirements which may not be in accordance with usual practice
		1.4	Ask questions of appropriate person to confirm unusual practice
		1.5	Ensure housekeeping is to requirements
		1.6	Identify hazards associated with the job and take appropriate action
		1.7	Perform other pre-operational checks in accordance with procedures
2	Start up item of equipment as required	2.1	Conduct pre-start checks
		2.2	Start up item of equipment
3	Operate equipment	3.1	Check equipment is operating within required limits

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	to procedures	3.2	Check product meets specifications and quality standards
		3.3	Ensure product is consistently ready for next duty/ operation as appropriate
		3.4	Maintain supply of material(s) as required
		3.5	Complete logs and records as required
		3.6	Collect and segregate scrap, trim and other materials as required
		3.7	Keep equipment and work area clean
		3.8	Pause equipment and perform emergency stop, as required
4	Respond to routine problems to procedures	4.1	Recognise known faults that occur during the operation
		4.2	Identify and take action on causes of routine faults
		4.3	Log problems as required
		4.4	Identify non-routine process and quality problems and take appropriate action

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the organisation's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Knowledge of and skills in the operation of the item of equipment and main components sufficient to consistently meet required specifications and standards, including:

- operation of equipment and components
- workflow sequences and materials demand
- reasons for checking process control panels and reporting readings which do not conform to the work instructions
- approved hazard control and safety procedures and the use of PPE in relation to handling materials and using equipment
- equipment operation and clean-up; potential effects of variations in raw materials and equipment operation in relation to quality of product
- waste management and importance of reusing non-conforming products wherever

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possible
- correct selection and use of equipment, materials, processes and procedures
- monitor equipment operation and product quality
- identify factors which may affect product quality or production output and appropriate remedies
- distinguish between possible causes of routine faults, such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults/damage
  - wrong raw materials/additives
  - machine failure.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the process.

Language, literacy and numeracy requirements

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, e.g. to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment	A holistic approach should be taken to the assessment. Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. Assessment will occur on an industrial example of the equipment and will be undertaken in a work-like environment.
Critical aspects for	It is essential that competence is demonstrated in the knowledge

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assessment and evidence required to demonstrate competency in this unit	and skills defined in this unit. These may include the ability to: • operating the plant unit • following approved procedures • take appropriate action to resolve faults or report faults to appropriate personnel • explain and implement relevant emergency procedures. Consistent performance should be demonstrated. For example, look to see that: • production standards are met consistently • upstream and downstream communication is timely and effective operating procedures and work instructions are read and interpreted correctly • problems are identified and appropriate action is taken (i.e. the problem is fixed or reported) • all safety procedures are followed.
Assessment method and context	Competence in this unit may be assessed: • in an appropriate, industrial item of equipment requiring demonstration of operation start and stop procedures • in a situation allowing the generation of evidence of the ability to respond to problems • by using a suitable simulation and/or a range of case studies/scenarios • through a combination of these techniques. In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions. Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.
Specific resources for assessment	This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required. Access must be provided to appropriate learning and/or

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assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Standards and codes Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context This competency applies to operators working either independently or as part of a work team.

Procedures All operations are performed in accordance with procedures.

Procedures mean all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment This competency includes use of equipment and tools, such as:

- process equipment and its major components
- hand tools used in the this process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment

Hazards Typical hazards include:

- spills
- dusts/vapours
- slips trips and falls
- temperature
- hazardous substances
- moving equipment
- manual handling hazards

Problems 'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- equipment malfunction
- variations in process conditions
- variations in materials or contamination of materials
- equipment, tool, die or mould damage
- routine product faults

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- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials

Variables Key variables to be monitored include:

- atmospheric conditions
- temperature (hot/cold) variations in equipment or product
- die/product tolerances
- system/operating pressure
- programming variables
- operator variability
- timing or product cycles

Product Product includes anything produced by a process step and so includes intermediate products such as the product from one process step which then becomes the feed for another

Unit Sector(s)

Not applicable.

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MSAPMOPS201A Cut polymer materials

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the skills and knowledge required to prepare and operate specialised equipment or procedures to cut polymer materials to size, shape or to a pattern, and resolve routine problems to procedures.

Application of the Unit

Application of the unit	This unit of competency applies to operators who are involved in the use of specialised equipment or processes to cut polymer material such as sheet, pipe or rod. The key factors are the making of products to meet quality standards and workplace requirements. This unit of competency is typically performed by operators working either independently or as part of a work team. It includes: • checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed • setting up equipment • preparing materials as required • ensuring that safety procedures are applied to reduce risks • identifying and taking action on routine process problems • completing logs and reports.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Check work requirements	1.1. Identify work requirements 1.2. Identify product, materials and equipment requirements for job 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice
2. Conduct pre-cutting	2.1. Check hazard controls are operational and

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ELEMENT	PERFORMANCE CRITERIA
operations as required	appropriate 2.2. Check raw materials are correct 2.3. Mark out/lay out job for cutting 2.4. Undertake other pre-cutting requirements in accordance with procedures
3. Cut to requirements	3.1. Operate cutting tools/equipment to cut materials to procedures 3.2. Monitor dimensions, shape, quality and quantity of cuts 3.3. Remedy faults and non-conformances by correcting operation or adjusting tools/equipment as required 3.4. Collect material which is able to be recycled or reused, separate and dispose of waste and scrap
4. Resolve routine problems	4.1. Identify likely faults that occur during the operation/task 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

• applying knowledge of the materials, equipment and processes sufficient to recognise out of specification products, process problems and materials faults
• identifying hazards associated with the job/work environment
• applying the hierarchy of control to the hazards
• distinguishing between causes of faults such as:
  • raw materials
  • mechanical
  • electrical/instrumental
• reading and interpreting typical product specifications, job sheets, procedures, material labels and safety information as provided to operators

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REQUIRED SKILLS AND KNOWLEDGE
• writing skills to the level of completing workplace forms • basic numeracy skills to determine that two 25 kg bags are needed to make up a requirement for 50 kg
Required knowledge
• organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards • different types of materials and their behaviour when cut, different cutting equipment and suitability for materials • controls of cutting equipment • routine faults in products and routine problems in process • causes of faults such as materials deficiencies, heat, changes to materials during the cutting process, equipment adjustments/set-up and equipment maintenance requirements • original manufacturer instructions and guidelines for the safe use of the cutting tools/equipment • relevant procedures relating to safe working practices prescribed for the equipment • local occupational health and safety (OHS) legislation and/or regulations • site-specific instructions based on production requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • recognise the importance of material properties and qualities • apply approved procedures • take appropriate action to resolve faults or report faults to appropriate personnel • explain and implement emergency shutdown procedures. Consistent performance should be demonstrated. For example, look to see that:

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EVIDENCE GUIDE	
	• material cutting production standards are met consistently • upstream and downstream communication is timely and effective • procedures and work instructions are read and interpreted correctly • problems are identified and appropriate action is taken (i.e. the problem is fixed or reported) • all safety procedures are followed.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. Assessment may be in conjunction with assessment of other units of competency where required.

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EVIDENCE GUIDE	
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Context	This unit of competency applies to operators working either independently or as part of a work team.
Work requirements	Work requirements may be determined from: • job/shop orders • plans/specifications • procedures • other means
Procedures	Procedures include: • all relevant workplace procedures • work instructions • temporary instructions • relevant industry and government codes and standards
Tools and equipment	Tools and equipment may include: • guillotines, power saws, jig saws, band saws and thermal cutting devices • controller, such as PLC (Programmable Logic Controller) if fitted • hand tools as required • relevant personal protective equipment
Hazards	Typical hazards include:

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RANGE STATEMENT	
	• fibres and dusts - airborne and handled • manual handling hazards • power tools, leads and power supplies • stationery and moving machinery, parts and components
Problems	Respond to routine problems means apply known solutions to a limited range of predictable problems. Typical process and product problems may include: • pattern, e.g. pattern incorrect, marking errors • equipment, e.g. wear and breakage, temperature variations, loss of power or drives, controller sequence and timer issues • process, e.g. sequencing problems
Records	Records may include: • log books/sheets • electronic records • job/work sheets • other records
Variables	Key variables to be monitored include: • material characteristics • material availability • type of cutting equipment • cutting edge condition

Unit Sector(s)

Unit sector	

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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MSAPMOPS202A Fabricate polymer materials

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the skills and knowledge required to fabricate polymer materials to a specified shape and resolve routine problems to procedure. It applies to rubber and plastic materials.

Application of the Unit

Application of the unit	This unit of competency applies to operators who are involved in the fabrication of polymer materials, typically sheet, pipe or rod, into specified shapes. This unit of competency is typically performed by operators working either independently or as part of a work team. It includes: • setting up equipment • preparing and checking materials as required • dealing with non-conforming products, waste and scrap • identifying and taking action on routine predictable process problems • completing logs and reports. Some fabrication applications may also require competence in bonding or welding polymers in which case, competency in this unit may also require competency in: • PMBPROD242A Bond polymers to surfaces • PMBPROD287B Weld plastics materials.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Check work requirements	1.1. Identify work requirements 1.2. Check product, materials and equipment meet requirements for job 1.3. Interpret plans, patterns, designs or specifications 1.4. Recognise requirements which may not be in accordance with usual practice 1.5. Ask questions of appropriate person to confirm unusual practice 1.6. Identify hazards associated with the job and apply

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ELEMENT	PERFORMANCE CRITERIA
	appropriate hazard controls 1.7. Complete records as required
2. Conduct pre-fabrication operations as required	2.1. Set up tools, jigs, fixtures and equipment ready for job 2.2. Identify materials, patterns and consumables required 2.3. Check hazard controls are operational and appropriate 2.4. Mark out/lay out job for fabrication 2.5. Undertake other pre-fabrication requirements in accordance with procedures 2.6. Identify non-conformances and report to appropriate personnel
3. Form materials to shape	3.1. Arrange materials in order prior to forming 3.2. Form and fix material into shape as required 3.3. Measure and check product is to specifications, making adjustments as required 3.4. Trim and finish joints and fabricated product as required
4. Resolve routine problems	4.1. Identify likely faults that occur during the operation/task 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Ensure appropriate records are maintained 4.4. Identify non-routine problems and report to designated person

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• applying knowledge of the materials, equipment and processes sufficient to recognise out of specification products, process problems and materials faults • identifying hazards associated with the job/work environment • applying the hierarchy of control to the hazards • planning own work including predicting consequences and identifying

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REQUIRED SKILLS AND KNOWLEDGE
improvements • identifying when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance • identifying and describing own role and role of others involved directly in the fabrication of materials process • reading and interpreting typical product specifications, job sheets, procedures, material labels and safety information as provided to operators • writing skills to the level of completing workplace forms. • basic numeracy skills to determine that two 25 kg bags are needed to make up a requirement for 50 kg
Required knowledge

• organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards
• process of fabricating materials and the main components sufficient for consistent production of quality products including:
  • production workflow sequences and material demand
  • identifying different types of materials and their behaviour when joined
  • identifying different, forming and joining equipment and suitability for materials
  • accurately monitoring equipment operation and product quality
  • the potential effects of variations in raw materials and outside variables in relation to quality of product
  • waste management and knowing the importance of reusing non-conforming products wherever possible
  • factors which may affect product quality of production output and appropriate remedies

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • apply the required skills and knowledge to the fabrication process

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EVIDENCE GUIDE	
	• apply approved procedures. Consistent performance should be demonstrated. For example, look to see that: • fabrication production standards are met consistently.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Context	This unit of competency includes the processes required to form materials into specified shapes, including cutting, bending, fixing, welding and finishing to component
Work requirements	Work requirements may be determined from: • job/shop orders • plans/specifications • procedures • other means
Procedures	Procedures include: • all relevant workplace procedures • work instructions • temporary instructions • relevant industry and government codes and standards
Tools and equipment	Tools and equipment may include: • power saws, jig saws and thermal cutting devices • drilling, riveting, bolting and stitching • hand tools as required • relevant personal protective equipment
Hazards	Typical hazards include: • fibres - airborne and handled • sharp edges, swarf and scrap • manual handling • cut hazards • power tools, leads and power supplies • stationary and moving machinery, parts and components
Form	Forming may require:

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RANGE STATEMENT	
	• bending, heating, holding in a jig fixture or other methods of achieving the required shape
Fix	Fixing may be by: • mechanical means (e.g. rivets, bolts) • chemical means (e.g. solvents, adhesives) • thermal (e.g. welding) or other processes. Additional units of competency may need to be accessed to cover some means of fixing.
Problems	Respond to routine problems means apply known solutions to a limited range of predictable problems. Typical process and product problems may include: • pattern incorrect • marking errors • wear and breakage • loss of power or drives • controller sequence and timer issues • sequencing problems
Records	Records may include: • log books/sheets • electronic records • job/work sheets • other records

Unit Sector(s)

Unit sector	

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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MSAPMOPS212A Use organisation computers or data systems

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the use of organisation computers or data systems in order to work effectively. The operator is familiar with the system, can locate and use the appropriate data and is able to accurately record data into the system as required. This competency covers the use of computer equipment and company software programs, including selecting the correct programs for use and identifying minor faults in equipment or software.

This competency is typically performed by operators working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to operators who are required to store and retrieve data, and produce documents, spreadsheets relevant to operational or administrative functions within the organisation. It includes:

- inputting data to the systems as required
- locating and accessing data as required for production support/problem solving
- using data to support business objectives
- producing construction documents, reports and spreadsheets
- running system checks and virus scans manually if automated systems fail
- producing required documentation within the security limits imposed by the company.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify applications of computer or data system for work role.	1.1 Identify data and information available from the system and its application to work role. 1.2 Identify data from work role which needs to be entered in the system.
2. Use the computer/data system.	2.1 Adjust work station equipment to meet ergonomic requirements and use appropriate posture. 2.2 Log-on according to procedures. 2.3 Navigate system as required. 2.4 Input data or make changes as required. 2.5 Check entered or edited data is correct. 2.6 Access required data/information. 2.7 Output data as required. 2.8 Use 'Help' as needed.
3. Save file and exit system.	3.1 Save and store data in appropriate directory or folder. 3.2 Close file and exit applications programs without loss of data.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	3.3 Back-up data if required in accordance with procedures.
4. Respond to routine problems with the system	4.1 Recognise known faults that occur during the operation. 4.2 Identify and take action on causes of routine faults. 4.3 Log problems as required. 4.4 Identify non-routine process and quality problems and take appropriate action.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes an understanding of the organisation data system to the level needed to use the system and recognise and resolve problems. In particular it includes the ability to:

- demonstrate the operation of and access to data from the system
- describe the scope and range of data required from the system, in order to support the solution of problems
- describe the nature of the scope and range of available data
- describe the causes and remedies of common problems such as those selected in the Range Statement
- describe principles of operation of the equipment and software, hazard policies and procedures, job procedures and work instructions
- explain the application of software in relation to work role.

Competence also includes the ability to isolate the causes of problems to a component of the organisation data system and to distinguish between causes of problems such as:

- incorrect or misleading data
- system software faults
- system equipment faults.

Language, **literacy and numeracy requirements**

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This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms

Numeracy is also required to the extent of requiring competence in essential mathematical functions including + - x and ÷.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The reasoning process behind the problem analysis and determining the required actions should be assessed.

Consistent performance should be demonstrated. For example, look to see that:

- in-plant computer programs are correctly utilised
- software problems are recognised and solved effectively and efficiently
- documents are completed to the standard required
- the operation and access to data from the system can be demonstrated
- data can be input and output from the system as required
- obvious problems in related to operation of the system are recognised and an appropriate contribution made to their solution.

Assessment method and context

Assessment will occur using industrial equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- on a processing plant allowing for operation under all normal and a range of abnormal conditions
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

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In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This unit of competency includes organisation computer and data systems. This may include systems which cover (select relevant items):

- Word and Excel documents
- safety, safety data and injury reporting
- orders, purchasing, stock levels and scheduling
- stock control, stores, warehousing and logistics
- materials hazards, labelling, materials identification, materials safety data sheets (MSDSs)
- batch data, schedules, production planning and operations planning
- product quality, statistical control, production trends and quality control
- maintenance, maintenance planning, procedures and spare parts.

The organisation systems will usually be computerised, but may include data sheets, paper or hard copy records, manuals and instructions.

Procedures

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All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- computers - stand alone and/or networked
- mobile terminals and hand held devices
- printers
- mouse, keyboard
- facsimile equipment
- onboard terminals
- scanners
- bar coders.

Software applications may include:

- CC mail and email
- Internet or intranet
- word processing, database and spreadsheet programs
- company/process specific software
- word processing, database and spreadsheet programs.

Documents may include:

- work orders
- work instructions/standard operating procedures
- email or CC mail
- faxes
- memos
- tables
- standard letters
- standard reports.

Hazards

Typical hazards include:

- repetition strain injuries
- glare from monitor screens
- damages cables or connections
- strains or injuries moving computer equipment.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- software problems, such as unable to access file, find correct page or send CC mail, input data.

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- loose or disconnected cables
- 'frozen' screens
- faulty monitors
- key board problems.

Variables

Key variables to be monitored include:

- types of hardware systems
- access and log on procedures
- types of software packages
- Internet/intranet systems
- types of data to be stored and retrieved.
-

Unit Sector(s)

Not applicable.

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MSAPMOPS244A Layout and cut materials

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the cutting of materials to shape and the resolving of routine problems to procedure. It applies to materials used in plastics fabrication, rubber and other manufacturing industries.

Application of the Unit

Application of this unit

This competency applies to operators who are involved in the fabrication of materials which first need to be cut into specified shapes. This competency is typically performed by operators working either independently or as part of a work team.

The operator will:

- check product for quality and conformity to specifications
- set up equipment
- prepare materials as required
- deal with non-conforming products, waste and scrap
- identify and action routine predictable process problems
- complete logs and reports.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Check work requirements.	1.1 Identify work requirements from production plan or request. 1.2 Check product, materials and equipment meet requirements for job(s). 1.3 Interpret plans, patterns, designs or specifications. 1.4 Recognise requirements which may not be in accordance with usual practice. 1.5 Ask questions of appropriate person to confirm unusual practice. 1.6 Ensure housekeeping is to requirements. 1.7 Identify hazards associated with the job and take appropriate action. 1.8 Complete logs and records as required.
2. Conduct pre-start checks as required.	2.1 Set up tools, jigs, fixtures and equipment ready for production. 2.2 Identify materials, patterns and consumables required. 2.3 Ensure safety equipment is available and fit for use. 2.4 Identify non-conformances and report as required.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
3. Layout materials for cutting.	3.1 Translate pattern/specification onto material. 3.2 Develop 3D or complex shapes into 2D shapes which can be cut. 3.3 Place material and prepare it for cutting.
4. Cut materials to shape.	4.1 Cut material to pattern, marking points for further processes. 4.2 Deal with faults and non-conformances by correcting operation or adjusting equipment as required. 4.3 Collect and reprocess/discard scrap/trim and other materials in accordance with workplace procedures.
5. Respond to routine problems in accordance with procedures.	5.1 Recognise known faults that occur during the operation. 5.2 Identify and take action on causes of routine faults. 5.3 Log problems as required. 5.4 Identify non-routine process and quality problems and take appropriate action.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures, relevant regulatory requirements and the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls applied to the fabricated materials process. Application of approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up.

Knowledge of and skills in the process of fabricating materials and the main components sufficient for consistent production of quality products includes:

- production workflow sequences and material demand.
- identifying different types of materials and their behaviour when cut and joined
- identifyingdifferent cutting, forming and joining equipment and suitability for materials
- accurately monitor equipment operation and product quality

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- the potential effects of variations in raw materials and outside variables in relation to quality of product.
- waste management and knowing the importance of re-using non-conforming products wherever possible
- identify factors which may affect product quality of production output and appropriate remedies
- radii of bending and related layout data
- development of relevant shapes into 2D cuttable shapes.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the fabrication of materials process.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, basic machine control panels, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- apply the required skills and knowledge to the fabrication process
- apply approved procedures.

Consistent performance should be demonstrated. For example, look to see thatfabrication production standards are met consistently.

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Assessment method and context

Assessment will occur using industrial equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- on an appropriate processing plant requiring demonstration of operation and emergency stop procedures
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the processes required to layout and cut materials into specified shapes.

Procedures

All operations are performed in accordance with procedures.

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Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- guillotines, power saws, jig saws, band saws, thermal cutting devices
- drilling,
- hand tools as required
- relevant personal protective equipment.

Hazards

Typical hazards include:

- fibres, airborne and handled
- sharp edges, swarf and scrap
- manual handling
- cut hazards
- power tools, leads and power supplies
- stationary and moving machinery, parts and components.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- pattern incorrect
- marking errors
- wear and breakage
- loss of power or drives
- controller sequence, timer issues
- sequencing problems.
-

Unit Sector(s)

Not applicable.

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MSAPMOPS301A Treat corrosion

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the skills and knowledge required to examine substrates and design of the object to be treated (e.g. plant, equipment and structures), determine by inspection the preparation and protection which might need to be applied and confirm that the specification received is appropriate.

Application of the Unit

Application of the unit	The unit applies to technicians who are responsible for preparing and protecting an object to a provided specification. They will be able to inspect the object and confirm that the specification is appropriate for this application. This unit is not intended to provide sufficient knowledge and skills to develop a specification. Generally the technician would operate independently or as part of a team and should be capable of performing all parts of this unit. At all times they would be liaising and cooperating with other members of the team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify nature of corrosion	1.1. Inspect object 1.2. Observe service environment and note likely causes of, and vulnerability to, corrosion 1.3. Identify the type of corrosion present or likely to occur
2. Interpret surface preparation and coating specification	2.1. Identify surface preparation method specified 2.2. Identify prepared surface specification 2.3. Identify protection method specified 2.4. Identify finished specification of protected surface
3. Confirm appropriateness of specification	3.1. Compare specification with existing or likely corrosion 3.2. Confirm that the specification is appropriate for the situation 3.3. Clarify any discrepancies between specification and expected treatment and take appropriate action
4. Monitor treatment	4.1. Identify hazards arising from the preparation and

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ELEMENT	PERFORMANCE CRITERIA
process	protection treatments 4.2. Implement appropriate hazard controls 4.3. Monitor the progress of the treatment 4.4. Recognise situations which might require a change to hazard controls or specifications 4.5. Take the required actions to resolve the identified situations

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- observing and inspecting work environment
- identifying and analysing hazards
- comparing specifications
- communicating with relevant personnel
- identifying and solving problems

Required knowledge

- the galvanic series
- electrochemical corrosion
- erosion and other non-electrochemical decay of materials as relevant
- corrosion of different types of metals
- forms of corrosion/causes of anode formation
- sacrificial protection and coating
- factors controlling the rate of corrosion
- types of corrosion protection used and how they work
- hazards (health, safety, environmental) associated with preparation and protection and relevant hazard controls
- costs and hazards of corrosion
- physics and chemistry relevant to the processes and the materials involved
- process parameters and limits, e.g. blast media type/size/shape, temperature, pressure, flow and pH
- coating/lining types as relevant
- coating/lining application methods as relevant
- duty of care obligations

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REQUIRED SKILLS AND KNOWLEDGE
• hierarchy of hazard control • routine problems, faults and their resolution • corrective action appropriate to the problem cause • function and troubleshooting of major preparation and protection methods and their problems • types and causes of problems within operator's scope of skill level and responsibility

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant, equipment, structures or similar in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. This unit of competency requires an application of the knowledge contained in the use of the corrosion control systems and their integral equipment, to the level needed to maintain control and recognise and resolve problems.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster. Consistent performance should be demonstrated. In particular look to see that: • early warning signs of potential problems are recognised • the range of possible causes can be identified and analysed and the most likely cause determined • appropriate action is taken to ensure a timely resolution to meet requirements.

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EVIDENCE GUIDE	
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation or case studies/scenarios may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual plant and will include 'walk-throughs' of the relevant competency components. A bank of scenarios/case studies/what ifs and questions will be required to probe the reasoning behind observable actions.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used
Service environment	Service environment refers to: • the environment in which the systems or units (object) the technician is responsible for operate and may be a plant/factory area, a well head, major infrastructure or pipeline covering thousands of kilometers
Corrosion	Corrosion typically refers to: • any electrochemical process leading to the decay of metal. It may also be applied to decay processes in non-metals if appropriate
Appropriate action	Appropriate action may include: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person
Procedures	Procedures may be written, verbal, computer-based or in some other form. They include: • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant

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RANGE STATEMENT	
	For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (e.g. Responsible Care) and government regulations
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through state/territory or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence
Hazards	Hazards may include: • dust, mists, fumes and waste disposal issues

Unit Sector(s)

Unit sector	

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSAPMOPS363A Organise on site work

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers organising of work in a field situation. This unit typically applies to operators who are preparing to do work in remote mine sites, or large industrial complexes where extensive permit or clearance systems exist.

This unit covers the organising and preparation for on site work. Refer to other competency units depending on the nature of the work to be done on site.

Application of the Unit

Application of this unit

The emphasis is on the planning of the work, the arrangements that are required to allow the on-site work to proceed and the set-up of tools, equipment and materials at the site. It includes the scoping, planning, communication and hazard controls required for the job. The work may be to do with conveyor systems, tanks, pipelines, equipment or other work in situ.

The worker will:

- plan the job
- arrange all permissions and permits
- select and arrange all equipment and materials to the site
- set up tools, equipment and materials on site
- identify any hazards and take appropriate action.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Plan the work.	1.1 Review the requirements of the work 1.2 Arrange all necessary permits and permissions for site inspections and work. 1.3 Examine the site where the work will take place. 1.4 Identify plant and equipment isolations. 1.5 Identify hazards and risk controls. 1.6 Plan to minimise downtime, economically use materials and meet quality specifications. 1.7 Plan work, including sequences, times, process stages, engineering controls and personal protection requirements. 1.8 Prepare all necessary documentation and finalise the permissions and approvals for conducting the work.
2. Prepare equipment. tools and materials.	2.1 Identify equipment, tools and materials required. 2.2 Arrange for supply of all tools, equipment and materials. 2.3 Arrange for transport to site of all equipment, tools

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	and materials.
3. Set up work location.	3.1 Assemble and check materials and tools for suitability for purpose. 3.2 Establish a safe work area. 3.3 Establish isolations and tag/lock out as required. 3.4 Check tools, equipment and materials against site situation and conditions.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out-of-specification production. For example, consumables for use in the work are within recommended shelf life.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls.

Application of approved hazard control, safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up. This may include the preparation of Job Hazard Analysis (JHA) or similar hazard management and planning techniques.

Competence includes the ability, for the practical completion of the job, to apply and/or explain:

- interpretation of specifications, designs and/or work orders
- understanding of the operation, equipment principles and details of construction
- production workflow sequences and inherent hazards with on-site work
- design requirements and details of the work to enable the planning to and the work to be completed as required
- planning process, including breaking the work down into steps and stages
- correct selection and use of equipment, materials, processes and procedures
- products, materials and material characteristics.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements

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- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required.

Language, literacy and numeracy requirements

This unit requires the ability to read and interpret typical work specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms, plans and job reports.

Numeracy is also required, eg to determine quantities of materials for the work.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

This unit may be co-assessed with units concerned with the nature of the work being undertaken.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- identify critical materials properties and operating characteristics in relation to the condition of the equipment
- plan work process within organisational procedures and explain the reasons for the steps in the process
- take appropriate action to observe site conditions, equipment configuration, possible work-site difficulties, hazards and identify problems to be reported.

Consistent performance should be demonstrated. For example, look to see that:

- production needs are interpreted and met
- problems are anticipated from observations
- problems are efficiently resolved
- the repair runs consistently and smoothly.

Assessment method and context

Assessment will occur using industrial scenarios and will be undertaken in a work-like environment.

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Competence in this unit may be assessed:

- on a processing plant allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing the generation of evidence of the ability to recognise, anticipate and solve problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to on-site work environments and sectors typically within manufacturing or heavy industries. It covers, but may not be limited to, the preparation for on-site work.

Procedures

All operations are performed in accordance with procedures.

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Procedures include all relevant workplace procedures, manufacturer specifications and procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

On-site work

On-site work covered by this competency may include (but may not be limited to):

- conveyor belt splicing and repairs
- rubber lagging of conveyor drums
- rubber lining of tanks
- polymer piping systems installation or repairs
- polymer constructions (eg fume cupboards or signs)
- refractory lining
- concrete casting
- other work to be done on-site, and not in a factory or workshop.

Work requirements

Work requirements may be determined from:

- work orders
- specifications
- job descriptions
- designs
- other documents.

Isolations

Isolations include:

- power supply
- tag locations
- process materials
- energy sources and
- equipment isolation system.

Safe work area

Safe work area includes area(s) for:

- scaffolding
- lifting gear
- lay down area
- work area
- other equipment in appropriate locations.

Tools and equipment

This competency includes planning and set-up of equipment and tools such as:

- manual handling aids
- hand winches
- portable power generators and vulcanising equipment

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- knives and other cutting instruments
- portable hoists/lifting equipment not requiring any special permits or licences
- spanners, wrenches, hammers etc
- power operated hand tools such as drills, cutting disks, sanders
- specialised tools for the job
- relevant personal protective equipment.

Hazards

Typical hazards include:

- manual handling hazards
- working at heights
- dust, process liquids, process materials
- hand tools and hand held power tools (eg knife, cutting and grinding disk hazards).

Problems

Anticipate and solve problems means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

- lack of accessibility
- equipment isolations
- logistics of materials ad equipment to work site
- variations in materials and/or contamination of materials.

Variables

Key variables to be monitored include:

- environmental conditions
- lock-out/isolation of equipment
- worksite location, remoteness, accessibility
- job variations, changes.
-

Unit Sector(s)

Not applicable.

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MSAPMOPS400A Optimise process/plant area

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the ability to optimise the process performance of a complete plant area. It includes ensuring that production systems comply with Health, Safety and Environment (HSE) requirements, that process, plant and equipment utilisation is planned and carried out, and that problems are solved to fully meet operational needs and ensure that production of finished goods meets customer requirements.

Application of the Unit

Application of this unit

This competency requires the application of detailed operational and process knowledge, including the principles of operation of equipment, and the chemistry and/or physics and/or biology/biochemistry of changes to materials occurring during processing. It embodies a significant breadth and depth of technical knowledge and process understanding.

Assessment of this competency should ensure that the applicant can apply this knowledge to a process, and should typically rely on the applicant undertaking, or leading, a significant process improvement project.

This competency is typically performed by a senior operator, team leader or frontline manager.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit **has** prerequisites of

- MSAPMSUP390A Use structured problem solving tools
-

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Analyse and evaluate current plant, equipment and processes.	1.1 Compare actual process, plant and equipment performance with requirements and/or historical data/records and/or design performance. 1.2 Identify abnormal or sub-optimal process, plant and equipment performance. 1.3 Identify hazards associated with the plant and equipment. 1.4 Collect and evaluate product, materials and/or process records to determine possible causes for sub-optimal performance. 1.5 Use appropriate techniques to rank possible causes from most to least probable cause.
2. Develop plan for corrective and/or optimisation action.	2.1 Analyse cause(s) to determine appropriate corrective action. 2.2 Predict the impact of a change in one unit/area on other related plant units/areas. 2.3 Predict the impact of a change on health, safety and environmental performance 2.4 Develop measurable objectives and evaluate alternatives.

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ELEMENT ELEMENT	**PERFORMANCE CRITERIA** Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	2.5 Identify requirements to implement change. 2.6 Consult with stakeholders regarding planned changes and impacts. 2.7 Develop optimisation plan taking account of hazards identified and HSE implications and communicate to appropriate personnel. 2.8 Evaluate optimisation action to determine measures of effectiveness.
3. Coordinate corrective and/ or optimisation action plan	3.1 Coordinate all appropriate unit areas and operations in order to rectify problem causes in process, plant and equipment performance. 3.2 Initiate and/or implement all required corrective/ optimisation actions. 3.3 Communicate corrective/optimisation outcomes to all relevant personnel. 3.4 Implement procedures/systems to eliminate possible future causes. 3.5 Record and maintain log of all relevant information.
4. Develop continuous improvement strategies.	4.1 Review sources of information to identify possible factors causing sub-optimal performance. 4.2 Identify options for removing or controlling the risk of sub-optimal performance. 4.3 Assess the adequacy of existing control and quality methods and systems. 4.4 Identify opportunities to continuously improve performance. 4.5 Develop recommendations for continual improvement of process, plant and equipment effectiveness. 4.6 Consult with appropriate personnel and implement continuous improvement strategies. 4.7 Document implementation of continuous improvement strategies.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the:

- equipment,
- processes
- systems

sufficient to

- identify hazards associated with the process
- recognise opportunities to improve and/or enhance the quality of performance of the plant.

This knowledge needs to include:

- the relevant technical theory of the plant area
- an in depth understanding across the entire plant area
- the organisation standard procedures and work instructions
- relevant regulatory requirements, including those related to OHS risk control as appropriate to process/plant area optimisation.

Competence includes the ability to:

- apply analytical skills which enable corrective or optimal conditions to prevail
- identify and control hazards by applying the hierarchy of control as part of the optimisation process
- interpret information and make appropriate process control decisions.

Competence includes the ability to distinguish between:

- optimum and marginal performance of the plant
- effective and marginal performance corrections and actions.

as is relevant to the practical operation of all major equipment/process/systems within the area.

Optimising process systems requires application of detailed operational and process knowledge to address issues such as:

- starting material quality
- yield maximisation
- throughput maximisation
- energy efficiency
- use of utilities
- labour utilisation
- overall cost
- efficient use of equipment
- reducing downtime
- minimisation of waste and rework
- improved workplace layout and workflow.

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Language, literacy and numeracy requirements

This unit requires the ability to communicate at all levels about what may be complex technical matters. It also requires the ability to evaluate complex information and sort often conflicting information into *useful* and *distracting* and to rank/prioritise information.

Writing is required to the level of reading and interpreting technical information, developing and modifying plans and procedures and interpreting relevant regulatory requirements.

Numeracy is required to the level of analysing product/process performance data, interpreting process condition information and deriving useful information from technical brochures, papers and similar. Calculation will be required to assist this and to determine priorities for optimisation plans (ie benefit/cost or other quantitative criteria)

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Competence must be demonstrated in the ability to analyse and evaluate current production performance, and develop and implement plans to optimise process systems.

While the technician is expected to take a lead technical role, and to demonstrate competence as defined above, optimisation is rarely undertaken by an individual alone and liaison with all relevant stakeholders is an expected part of this competency.

Where the assessee does not currently possess evidence of competency in *MSASUP390A Use structured problem solving tools*, it may be coassessed with this unit.

Criticalaspects for assessment and evidence required to demonstrate competency in this unit

It is essential that the equipment/process/system be understood in depth and that the importance of critical material properties/settings/readings is known. Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action.

Consistent performance should be demonstrated. For example, look to see that:

- non-routine problems are recognised and defined
- hazards are identified and controlled by applying the hierarchy of control

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- possible causes of complex problems are identified based on experience and the use of analytical techniques in solving the problem, including identifying variations and cause, separating single problems from multiple problems and the recognition of recurring problems
- fundamental cause of process or equipment faults is determined
- corrective/preventative actions are developed to avoid recurrence of the problem and optimise the condition of the process, plant and equipment
- product quality and uniformity are maintained.

Competence must be demonstrated in the operation of all ancillary equipment to the level required for this competency unit.

Competence also includes the ability to implement improvements within appropriate time constraints and in a manner relevant to the operation of the equipment, processes and systems.

Context of assessment

Competence in this unit may be assessed by:

- observation over time in a processing plant allowing for adequate assessment of operation under all normal and a range of abnormal conditions. Where this is not practical, additional assessment techniques must be used.
- using a suitable simulation and/or a range of case studies/scenarios
- undertaking a specific project based in the plant
- a combination of these techniques.

Method of assessment

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

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The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This unit describes the work conducted by senior operators, team leaders or front line managers who optimise process systems as part of their work function. It includes all items of equipment and unit operations which form part of the production process of a complete area.

Typical problems will require the application of detailed operational and process knowledge over the entire production/manufacturing area, including the principles of operation of the equipment and the chemistry, physics, biology and/or biochemistry of the changes to materials occurring within that area.

All operations are performed in accordance with organisation procedures, licensing requirements, legislative requirements and industrial awards and agreements.

Procedures

All operations are performed in accordance with procedures. Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include or have been prepared from/to comply with:

- industry codes of practice
- materials safety data sheets
- equipment manuals
- equipment start up, operation and shut down procedures
- calibration and maintenance schedules
- quality manuals and procedures
- organisation recording and reporting procedures
- production and laboratory schedules
- material, production and product specifications.

Data/records

Historical data/records may include:

- hazard logs
- incident reports
- maintenance records
- product non-conformance reports
- production records.

Implementing change

Requirements to implement change may include:

- changes to procedures

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- training of operators
- equipment modifications
- ensuring all HSE requirements are addressed.

Relevant/appropriate personnel

Relevant/appropriate personnel may include:

- managers
- OHS representatives and OHS committee.

Relevant information

Relevant information logged to include:

- modifications to plant or equipment
- modifications to procedures or practices.

Sources of information

Sources of information may include:

- hazard logs
- incident reports
- maintenance records
- work practices
- procedures
- industry journals
- equipment supplier information
- industry best practice information.

Health, **Safety and Environment** (**HSE**)

All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Not applicable.

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MSAPMOPS401A Trial new process or product

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency typically applies to a technician in a plant who is taking a lead technical role in the trialling of a new product or the trialling of a new or significantly altered process. This competency does not apply to minor modifications to existing products or processes. Similarly it does not apply to a technician or operator taking part in such trials, and/or who is following directions set by the technician, chemist, engineer, supervisor or manager.

The technician is expected to be a technical expert in that part of the plant/process where the trial is being conducted.

Application of the Unit

Application of this unit

The technician would be expected to operate and control all equipment required for the trial. Generally the technician would be part of a team during the trial, and would usually be working in conjunction with a process/product development expert such as a chemist or engineer. The technician is often the most technically competent member of an operational team. As such they may not have the 'hands on' role of operating items of equipment, but they are expected to have the competence to direct the operation of equipment as appropriate throughout the trial. At all times they would be liaising and cooperating with other members of the team.

Trialling refers to the scale-up and other development steps required to take a new product or process from its design/laboratory trials to full commercial operation on a plant. Trialling may be done on a pilot plant where available and/or on a full scale plant.

The technician would:

- identify and rectify operational problems within their scope
- analyse the trial, both while it is occurring and after completion, and suggest improvements
- be alert for indications of developing problems and take required action to ensure the trial remains safe to people, the environment and the plant.
-

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	**PERFORMANCE CRITERIA**
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Contribute to the selection of equipment/process conditions.	1.1 Liaise with appropriate technical expert(s). 1.2 Interpret properties of materials and desired product characteristics. 1.3 Interpret technical specifications/drawings of plant requirements. 1.4 Recommend equipment/ancillary equipment appropriate for the materials, products and conditions. 1.5 Recommend process conditions appropriate for the

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ELEMENT ELEMENT	**PERFORMANCE CRITERIA** Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	equipment, materials and product characteristics. 1.6 Recommend feed rates/order/condition appropriate to the process conditions, equipment, materials and product characteristics. 1.7 Ensure hazard identification and analysis procedures are completed, including consultation with stakeholders, and findings included in plan. 1.8 Ensure recommendations meet the identified need.
2. Prepare for trials.	2.1 Determine the availability of resources required such as materials, equipment, people and skills. 2.2 Estimate time required for trial. 2.3 Liaise with relevant stakeholders. 2.4 Schedule trial at a convenient time. 2.5 Develop documentation for the trial. 2.6 Identify potential hazards and required hazard control procedures by applying the hierarchy of control. 2.7 Determine clearance requirements and special safety and storage requirements. 2.8 Verify decisions with appropriate experts/stakeholders. 2.9 Ensure people with adequate skills are available for the trial.
3. Conduct test runs/trials	3.1 Ensure hazard controls are implemented prior to commencement. 3.2 Run trials. 3.3 Maintain communication with all relevant people. 3.4 Closely monitor critical parameters. 3.5 Recognise actual and potential problems. 3.6 Make adjustments to process conditions as required during trial. 3.7 Sample and test product as required. 3.8 Record and report performance data. 3.9 Ensure all materials, products and waste are handled correctly. 3.10 Leave plant in a condition suitable for routine production to recommence.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
4. Evaluate results and identify modifications.	4.1 Interpret data from trial. 4.2 Identify factors which might be related to low rates or low charge amounts. 4.3 Recommend modifications and improvements required. 4.4 Develop and check standard operating procedure. 4.5 Complete documentation and report to appropriate personnel. 4.6 Ensure all relevant staff have required skill levels for the introduction of the new process.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Competence includes an understanding of the plant systems and all integral equipment involved in the trial to the level needed to control the system and recognise and resolve problems. In particular it includes the ability to:

- identify all items on a schematic of the plant and describe the function of each
- describe the nature/condition of materials entering and leaving each stage of the process, the changes which have occurred in that stage and why they have occurred
- state the major design features of plant equipment, plant conditions and variables and the impact of these on the properties of materials passing through them
- describe the causes and remedies of common problems such as those selected in the Range Statement
- apply the hierarchy of control to minimise the risk of hazards identified
- describe methods of changing rate and the advantages and disadvantages of each
- describe methods of controlling other process variables and the advantages and disadvantages of each.

Competence also includes the ability to isolate the causes of problems to an item of equipment within the plant system and to be able to distinguish between causes of problems/alarm/fault indications such as:

- process material variations
- instrument failure/wrong reading
- electrical failure

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- mechanical failure
- operational problem.

Language, literacy and numeracy requirements

This unit requires the ability to communicate and liaise with people at a range of levels about technical matters.

Reading is required to the level of interpreting technical specifications, manuals and procedures; and writing technical documentation such as specifications and procedures required for the trial.

Numeracy is required to the level of interpreting technical specifications and test results, analysing process data and determining required variations in process variables.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency.

Assessment will occur over a range of situations which will include disruptions to normal, smooth operation.

Critical aspects

It is essential that competence is demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster.

Consistent performance should be demonstrated. For example, look to see that:

- hazards are identified and controlled
- early warning signs of equipment/processes needing attention or with potential problems are recognised
- the range of possible causes can be identified and analysed and the most likely cause determined
- appropriate and timely action is taken to ensure the safety and success of the trial
- obvious problems in related plant areas are recognised and an appropriate contribution made to their solution.

Context and method of assessment

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This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of 'what if' scenarios both on the plant (during demonstration of normal operations and walk throughs of abnormal operations) and off the plant.

Competence in this unit may be assessed:

- using a pilot plant or a production plant as appropriate
- using a range of scenarios/case studies and 'what ifs' as the stimulus with a walk-through forming part of the response
- using a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources
- using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge; and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This unit includes all items of equipment and unit operations which form part of the trial.

Liaison

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Liaison with technical experts may (depending on trial requirements and company protocols) include one or more of:

- manufacturers
- chemists
- engineering personnel
- designers
- OHS advisors
- maintenance personnel
- potential customers.

Hazard analysis

Hazard analysis procedures may include:

- JSA/JHA (Job Safety Analysis/Job Hazard Analysis)
- hazard and operability (HAZOP) studies
- hazard analysis (HAZAN) studies
- other company specified procedures.

It is not expected that the candidate will be able to conduct technical hazard analysis procedures (such as HAZOP or HAZAN) but they should be able to interpret and use the outcomes of such analyses where relevant.

Hazards

Hazards may be determined from:

- materials safety data sheets (MSDSs)
- other relevant documentation such as hazard logs, incident reports
- company hazard identification procedures
- hazard analysis results
- standard operating procedures.

Waste handling

Waste handling may include:

- collection for re-use
- recycling
- disposal in accordance with health and environmental regulations.

Problems

Typical problems for the trial might include:

- mixing is poor
- materials do not behave as expected
- process/reaction does not proceed /proceeds too slowly
- process/reaction proceeds too quickly/runs away
- yield is low
- quality is out of specification
- process is unstable

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- instrumentation is not sufficiently sensitive/too sensitive
- variable catalyst activity
- surging flow/pressure.

Health, **Safety and Environment** (**HSE**)

All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Unit Sector(s)

Not applicable.

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MSAPMOPS404A Co-ordinate maintenance

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit applies to employees who coordinate maintenance of a manufacturing facility. It applies to all sectors of the industry.

This competency is typically performed by experienced technicians, supervisors, maintenance coordinators or team leaders, working either independently or as part of a team.

Application of the Unit

Application of this unit

This competency applies to supervisors and technicians who are required to apply knowledge of equipment operating principles, service requirements and workplace production operations to the coordination of maintenance activities. The key factors are the coordination of maintenance activities to meet the objectives of restoring the plant/equipment condition, consistent with production requirements.

The technician will:

- identify and plan maintenance work consistent with production requirements
- interpret data and information on equipment
- develop and monitor workplans for the maintenance activities
- organise materials, consumables and personnel to meet the maintenance objectives
- check tools, equipment, materials and output for conformity to job requirements
- complete logs and reports.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

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This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the evidence guide.
1. Plan maintenance.	1.1 Develop work plans for scheduled routine maintenance activities. 1.2 Develop maintenance plans for unscheduled maintenance activities. 1.3 Source maintenance providers (internal/external). 1.4 Develop costings for maintenance work. 1.5 Implement measures to control identified hazards in line with procedures and duty of care. 1.6 Document and record required production interruptions, processes and procedures. 1.7 Obtain clearances for the maintenance work.
2. Organise maintenance.	2.1 Schedule maintenance activities, with reference to production requirements and availability of resources. 2.2 Review available maintenance expertise and arrange appropriate training and assessment where necessary.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the evidence guide.
	2.3 Obtain approvals for maintenance schedule as necessary to coordinate with production requirements.
3. Assemble maintenance requirements.	3.1 Determine resources required (equipment, personnel and consumables) to meet maintenance schedule. 3.2 Locate and coordinate supply of consumables, equipment and expertise to meet maintenance schedule. 3.3 Purchase equipment, consumables and expertise as required.
4. Complete maintenance.	4.1 Complete maintenance schedule. 4.2 Make appropriate readings, measurements and recordings and compare to equipment, product and other relevant specifications. 4.3 Identify areas requiring further testing and recommend appropriate procedures to supervisory staff. 4.4 Make appropriate adjustments to the maintenance schedule. 4.5 Complete records as required, noting areas where changes to equipment operation or routine maintenance are required.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge and understanding of equipment operation, planning and maintenance practices sufficient to plan for maintenance requirements in standard and non-standard situations and then determine appropriate action which is consistent with operation guidelines is required.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

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Application of the knowledge of managing risks using the hierarchy of controls applied to the process. Application of approved hazard control, safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up.

Knowledge as a basis for solving processing and material problems, including:

- characteristics and capabilities of equipment, materials and processes used
- functions and troubleshooting of internal components and their problems
- routine and non-routine causes of equipment failures and the service conditions which may increase maintenance
- urgency and timeliness factors in planning maintenance activities in relation to production requirements
- proactive, predictive, preventative and reactive maintenance principles
- implications of maintenance for production and work activities
- source requirements for maintenance
- safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
- the hierarchy of control including engineering controls.

Competence also includes the ability to:

- identify factors in production schedules, time and resource requirements (including external sources) in scheduling maintenance activities
- schedule maintenance functions in the most timely and cost effective manner
- apply relevant agreements, codes of practice or other legislative requirements
- ensure workplace is safe for maintenance activities.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical manufacturer specifications, equipment procedures, production schedules and material labels as provided to coordinators.

Writing is required to the level of completing workplace reports and proposals.

Numeracy is also required, eg analysing statistical information/historical data in the form of tables and graphs

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

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Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability to:

- recognise potential situations requiring action
- implement appropriate action.

Consistent performance should be demonstrated. For example, look to see that:

- early warning signs of equipment in need of attention/with potential problems are recognised
- planned work sequences are logical and conform with production schedules and work rosters
- maintenance schedules for reactive, planned and proactive maintenance are coordinated based upon the most appropriate and cost effective method to ensure equipment reliability and optimum performance
- plans are initiated and monitored, with activities modified for variations in workplace contexts and the environment, until final resolution has occurred.

Assessment method and context

It is preferred that assessment takes place in an industrial work environment.

Competence in this unit may be assessed:

- on a processing plant allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing the generation of evidence of the ability to recognise, anticipate and solve problems
- using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

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Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments and sectors within the manufacturing industry. It does not include maintenance which would require trade level skills. It is not intended that this competency would cover performing maintenance which is carried on in a workshop.

This may include:

- predictive and preventative operational maintenance
- proactive maintenance
- reactive maintenance.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- hand tools specific for the task
- testing equipment
- measuring and aligning equipment
- computer equipment
- relevant personal protective equipment.

Hazards

Typical hazards to be considered, include:

- isolations of energy sources, motive power and process materials
- manual handling of machinery components and the need for lifting devices
- hot, cold or components containing dangerous materials
- external hazards (eg traffic into a maintenance area)

Problems

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

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Typical process and product problems which may require maintenance, include:

- equipment performance outside of specification or requirements
- equipment breakdown
- equipment wear and tear.

Variables

Key variables to be monitored include:

- relationship of maintenance plan to production requirements
- costs of maintenance
- availability of materials and services
- documentation and record keeping.

Data and Records

Typical information sources, observed data and plant records may include:

- plant data
- log sheets
- production schedules
- operational and performance reports
- physical aspects such as noise, smell, feel and pressure
- condition monitoring information
- planned maintenance schedules
- standard operating procedures
- manufacturer instructions, specifications and service manuals
- machine circuit diagrams for hydraulic/pneumatic and electrical/electronic circuits
- plant description manuals.
-

Unit Sector(s)

Not applicable.

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MSAPMOPS405A Identify problems in fluid power system

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the recognition and diagnosis of control system problems in hydraulic/pneumatic control systems on process equipment. It includes the implementation of appropriate corrective action. It applies to all sectors of the industry.

This competency is typically performed by technicians working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to operators who are required to apply knowledge of fluid power systems and components to the identification and isolation of faults in equipment. The key factors are the diagnosis and the recommendation of action to resolve routine and non-routine faults, in order to return the equipment to production.

The technician will:

- identify and plan scope of equipment checks
- check settings, adjustments and performance of equipment
- identify and isolate faults in equipment
- propose solutions and carry out solutions within scope of authority
- complete logs and reports.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify pneumatic/ hydraulic control system problems.	1.1 Categorise the types of machine malfunctions due to fluid power faults. 1.2 Describe the effects on product quality of fluid power problems. 1.3 Isolate possible faulty components from a circuit diagram and knowledge of the function of each component.
2. Implement appropriate corrective action.	2.1 Examine other possible faults. 2.2 Shortlist possible fault causes. 2.3 Conduct investigations of machine, products or data to determine most likely fault cause(s). 2.4 Take appropriate action to ensure fault is rectified. 2.5 Follow up on action to ensure completion in an appropriate time frame. 2.6 Recheck after corrective action to ensure fault has been rectified.
3. Identify maintenance	3.1 Check manufacturer instructions to determine

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
requirements.	recommended maintenance schedule. 3.2 Check fault and maintenance history to determine adequacy of current regime and special requirements. 3.3 Determine criticality of machine to production/business. 3.4 Develop maintenance schedule/requirements for machine. 3.5 Liaise with all relevant stakeholders to ensure schedule is appropriate. 3.6 Report outcome to appropriate personnel.
4. Identify pneumatic/ hydraulic control system problems.	4.1 Categorise the types of machine malfunctions due to fluid power faults. 4.2 Describe the effects on product quality of fluid power problems. 4.3 Isolate possible faulty components from a circuit diagram and knowledge of the function of each component.
5. Implement appropriate corrective action.	5.1 Examine other possible faults. 5.2 Shortlist possible fault causes. 5.3 Conduct investigations of machine, products or data to determine most likely fault cause(s). 5.4 Take appropriate action to ensure fault is rectified. 5.5 Follow up on action to ensure completion in an appropriate time frame. 5.6 Recheck after corrective action to ensure fault has been rectified.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the process and the interaction of process conditions on product quality sufficient to recognise and analyse control system faults.

Knowledge of organisation procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

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Application of the knowledge of managing risks using the hierarchy of controls applied to the process. Application of approved hazard control, safety procedures, use of PPE in relation to handling materials, equipment operation and clean up.

Knowledge as a basis for solving hydraulic system problems, including:

- principles of hydraulics/pneumatics
- fluid power circuit diagrams
- principles of circuit components
- appropriate testing procedures and use of equipment for a range of equipment faults
- urgency and timeliness factors in planning maintenance activities in relation to production requirements
- collection, analysis and reporting of data.

Competence also includes the ability to:

- identify and select testing methods based on cost and time effectiveness
- conduct inspections, checks and tests on equipment as appropriate
- read and interpret circuit diagrams for mechanical, hydraulic, pneumatic and electrical/electronic operating systems
- use technical information and manufacturer information to locate relevant data
- interpret technical specifications and manufacturer instructions
- ensure workplace is safe for testing and maintenance of equipment
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret technical specifications and manufacturer manuals.

Writing is required to the level of writing procedures and schedules. Basic numeracy is also required to allow the interpretation of machine and product data and the comparison of actual with desired readings.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

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Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability to:

- recognise potential situations requiring action and then in implementing appropriate action.

Consistent performance should be demonstrated. For example, look to see that:

- machine reliability is high.

Assessment method and context

It is preferred that assessment takes place on industrial equipment in a work environment.

Competence in this unit may be assessed:

- on a processing plant allowing for operation under all normal, and a range of abnormal, conditions
- in a situation allowing the generation of evidence of the ability to recognise, anticipate and solve problems
- using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

Additional resources might include the provision of equipment with known faults/problems to allow for assessment of the ability to identify problems.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

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Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes all common equipment used in the manufacturing industry and should be able to be applied to all equipment using fluid power control systems.

This competency applies to all work environments and sectors within the manufacturing industry. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions, manufacturer information and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- pumps
- pressure controls
- DCVs (directional control valves)
- flow control actuators
- accumulators
- filters
- heat exchangers
- proportional, servo and cartridge valves.

Hazards

Typical hazards include:

- high pressures (hydraulic and pneumatic)
- hot surfaces
- hydraulic oil spills and leakage
- noise.

Problems

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Distinguish between causes of faults such as:

- control system failure
- process condition
- materials
- component types.

Typical process and product problems may include:

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- loss of flow, power
- power failure
- oil leaks (internal and external)
- component malfunction
- poor maintenance procedures
- regular maintenance
- shutdown
- using accumulator as emergency source
- motor failure effect on cycle time
- pressure loss
- short shots
- loss of clamp pressure
- oil temperature.

Variables

Key variables to be monitored include:

- oil levels
- temperatures
- cavitation/aeration/noise
- cleanliness
- poor performance
- safety aspects.
-

Unit Sector(s)

Not applicable.

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MSAPMOPS406A Identify problems in electronic control systems

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the recognition and diagnosis of control system problems in electrical/electronic control systems on process equipment. It includes the implementation of appropriate corrective action. It applies to all sectors of the industry.

This competency is typically performed by technicians working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to operators who are required to apply knowledge of electronic control systems and components to the identification and isolation of faults in equipment. The key factors are the diagnosis and the recommendation of action to resolve routine and non-routine faults, in order to return the equipment to production.

The technician will:

- identify and plan scope of equipment checks
- check settings, adjustments and performance of equipment
- identify and isolate faults in equipment
- propose solutions and carry out solutions within scope of authority
- complete logs and reports.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify electrical/ electronic control system problems.	1.1 Categorise the types of machine malfunctions due to electrical/electronic faults. 1.2 Describe the effects on product quality of electrical/electronic problems. 1.3 Isolate possible faulty components from a circuit diagram and knowledge of the function of each component.
2. Implement appropriate corrective action.	2.1 Examine other possible faults. 2.2 Short list possible fault causes. 2.3 Conduct investigations of machine, products or data to determine most likely fault cause(s). 2.4 Take appropriate action to ensure fault is rectified. 2.5 Follow up on action to ensure completion in an appropriate time frame. 2.6 Recheck after corrective action to ensure fault has been rectified.
3. Identify maintenance	3.1 Check manufacturer instructions to determine

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
requirements.	recommended maintenance schedule. 3.2 Check fault and maintenance history to determine adequacy of current regime and special requirements. 3.3 Determine criticality of machine to production/business. 3.4 Develop maintenance schedule/requirements for machine. 3.5 Liaise with all relevant stakeholders to ensure schedule is appropriate. 3.6 Report outcome to appropriate personnel.
4. Identify electronic control system problems.	4.1 Categorise the types of machine malfunctions due to electronic control system faults. 4.2 Describe the effects on product quality of electronic control system problems. 4.3 Isolate possible faulty components from a circuit diagram and knowledge of the function of each component.
5. Implement appropriate corrective action.	5.1 Examine other possible faults. 5.2 Shortlist possible fault causes. 5.3 Conduct investigations of machine, products or data to determine most likely fault cause(s). 5.4 Take appropriate action to ensure fault is rectified. 5.5 Follow up on action to ensure completion in an appropriate time frame. 5.6 Recheck after corrective action to ensure fault has been rectified.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the process and the interaction of process conditions on product quality sufficient to recognise and analyse control system faults.

Knowledge of organisation procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

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Application of the knowledge of managing risks using the hierarchy of controls applied to the process. Application of approved hazard control, safety procedures, use of PPE in relation to handling materials, equipment operation and clean up.

Knowledge as a basis for solving electronic control system problems, including:

- fundamentals of electricity and electronics
- electronic circuit diagrams
- principles of electronic circuit components
- principles of PLC programming, troubleshooting and diagnosis
- appropriate testing procedures and use of equipment for a range of equipment faults
- urgency and timeliness factors in planning maintenance activities in relation to production requirements
- collection, analysis and reporting of data.

Competence also includes the ability to:

- identify and select testing methods based on cost and time effectiveness
- conduct inspections, checks and tests on equipment as appropriate
- read and interpret circuit diagrams for mechanical, hydraulic, pneumatic and electrical/electronic operating systems
- use technical information and manufacturer information to locate relevant data
- interpret technical specifications and manufacturer instructions
- ensure workplace is safe for testing and maintenance of equipment
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret technical specifications and manufacturer manuals.

Writing is required to the level of writing procedures and schedules. Basic numeracy is also required to allow the interpretation of machine and product data and the comparison of actual with desired readings.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

It is preferred that assessment takes place on industrial equipment in a work environment.

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Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability to:

- recognise potential situations requiring action and then in implementing appropriate action.

Consistent performance should be demonstrated. For example, look to see that:

- machine reliability is high.

Assessment method and context

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Competence in this unit may be assessed:

- on a processing plant allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing the generation of evidence of the ability to recognise, anticipate and solve problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

Additional resources might include the provision of equipment with known faults/problems to allow for assessment of the ability to identify problems.

Range Statement

RANGE STATEMENT

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The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes all common equipment used in the manufacturing industry and should be able to be applied to all equipment using electrical/ electronic control systems.

This competency applies to all work environments and sectors within the manufacturing industry. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- application and programming of PLC (programmable logic controls) and ancillaries
- application of solid-state control/switching units
- switches, relays and solenoids
- position and pressure transducers
- temperature controllers.

Hazards

Typical hazards include:

- electricity
- temperature from hot surfaces and equipment
- malfunctioning equipment
- test equipment.

Problems

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems may include:

- loss of flow, power
- power failure
- component malfunction
- poor maintenance procedures
- regular maintenance
- shutdown

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- motor failure effect on cycle time
- short shots
- loss of clamp pressure
- no power
- electronic/electrical faults
- analysis with PLC.

Variables

Key variables to be monitored include:

- temperatures
- cleanliness
- poor performance
- safety aspects.
-

Unit Sector(s)

Not applicable.

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MSAPMOPS601A Design equipment and system modifications

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the skills and knowledge needed to design equipment and system modifications in a manufacturing situation. This unit is typically performed by high level staff, working as part of a design, development and implementation team and taking a lead technical role. It does not include the design of equipment requiring specialist engineering skills or regulatory licensing, although it may include working with a person with these skills/licence.

Application of the Unit

Application of the unit	This competency applies to people who design modifications to equipment or systems, typically used for production. The modification may be to improve productivity, improve reliability, reduce waste (muda), reduce cost or other reasons. The competency can apply to the design of equipment/system modifications associated with product changes or improvements and/or establishment of a new production line/product. Typically it will be to meet a specified end use. This will involve working closely with a range of management and operations personnel and requires balancing the business, operational and technical sides of the modified equipment/system. This unit of competency applies to the technical expert. The competency is applied under limited guidance in line with a broad plan, budget or strategy This competency is typically performed by senior technologists working in liaison with other technical experts, operations management, operators and other

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	relevant people with whom they would work as part of a (possibly ad hoc) team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Assess requirements.	1.1. Establish modification or design requirement 1.2. Establish design concepts 1.3. Establish design limitations 1.4. Consult specialists/experts as required

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ELEMENT	PERFORMANCE CRITERIA
2. Evaluate options.	2.1. Define options 2.2. Determine most appropriate modification 2.3. Confirm selected option with appropriate personnel in accordance with workplace procedures
3. Design modifications.	3.1. Design modification to meet end use specifications/standards and all legislative or regulatory requirements 3.2. Verify design in accordance with enterprise procedures
4. Coordinate design implementation and testing.	4.1. Coordinate implementation of the design/modification 4.2. Assess design outcome test results to establish conformance to requirements 4.3. Assess variations to the design where necessary 4.4. Prepare documentation to meet all requirements
5. Maintain records	5.1. Maintained records of design and modification outcomes in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills may include (but may not be restricted to):

- interpret design requirements
- apply technical skills, including performing technical calculations
- conduct tests and prepare drawings/documentation
- evaluate design options
- communicate effectively within the workplace, including liaising with other departments
- establish or interpret procedures, where required
- determine report requirements and present information in appropriate formats

Required knowledge

Required knowledge, to the breadth and depth required to design equipment and system modifications may include (but may not be restricted to):

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REQUIRED SKILLS AND KNOWLEDGE
• appropriate design techniques • relevant Australian design standards • OHS considerations and environmental factors in relation to equipment/system design • safety and environmental aspects of relevant enterprise activities • workplace procedures and reporting/recording processes • relevant regulatory requirements and codes of practice.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessment for this unit of competency will be in a work environment or a simulated work environment. Assessment must confirm appropriate knowledge and skills to: • establish design/modification requirements • assess design and modification options • organise implementation of design/modification • ensure work meets specifications • apply workplace health and safety policies in work operations • maintain accurate records
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. This requires access to real or appropriately simulated situations involving the design of equipment and system modifications for applications within a manufacturing context. This includes real or simulated work areas, materials, equipment, and information on work specifications, manufacturer's instructions, relevant safety procedures and regulations, quality standards, organisation procedures and customer requirements.

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EVIDENCE GUIDE	
Method of assessment	
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Procedures	Procedures may be written, verbal, computer-based or in some other form. They include: • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (e.g. Responsible Care) and government regulations All work will comply with procedures
Modification/design requirements	Modification/design requirements may include (but is not restricted to) the following factors: • production, • facility,

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RANGE STATEMENT	
	• OHS • sustainability
Design concepts	Design concepts may include (but are not restricted to) the following requirements: • process, • material, • quantity, • cost and • outcome
Design limitations	Design limitations may be determined from (but are not restricted to) the following as applicable: • codes, • regulations and • technical documentation
Design	Design activities relate to processes which are based on established principles and practices, and that require modifications determined by experience and analysis Activities may involve (but are not limited to): • design research and consultation with internal or external specialists • assessment and evaluation of design concepts • design implementation and testing of modifications
Applicable regulations and legislation	Applicable regulations and legislation may include (but are not limited to): • occupational health and safety legislation and regulation relevant to workplace activities • relevant Australian design standards • workers' compensation legislation and regulation • environmental legislation and regulations • industry codes of practice • Australian (or other) Standards
Appropriate action	Appropriate action includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution

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RANGE STATEMENT	
	within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent HSE requirements, which may be imposed through state, territory or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence

Unit Sector(s)

Unit sector	Operational/technical

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSAPMPER200C Work in accordance with an issued permit

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit aims to ensure that people working under a permit to work understand the system, know the limitations of the permit under which they are working and comply with all the requirements of the permit. The people to whom this unit applies may be called 'permit recipients' or 'permit holders' by some organisations. Some organisations call 'permits' 'clearances' This unit covers the basic competency of working under a permit. Where entry to a confined space is required, then *MSAPMPER205B Enter confined space* is also required. The safety observer (standby person) competencies are covered by *MSAPMPER202A Observe permit work*. Atmospheric testing is covered by *MSAPMOHS217A Gas test atmospheres*. The issuing of permits is covered by *MSAPMPER300B Issue work permits*.

Application of the Unit

Application of the unit	This competency applies to persons who are required to conduct work activities under the authority of an issued permit to work and within the context and requirements of that permit. This typically applies to all work done by maintenance staff and contractors, and also to any other non-process work performed on the plant. It includes: • identifying the range and scope of work covered by the permit • checking that the right type of permit has been issued for the type of work • adequately preparing to undertake the work, including obtaining all necessary safety equipment and PPE • undertaking the work strictly in accordance with the provisions of the permit • maintaining correct housekeeping with permit activities • completing work in accordance with the permit requirements • querying or raising matters about the permit if the scope of work/nature of the tools to be used varies from that covered by the permit • handing back the permit in accordance with procedures and obtaining appropriate sign off as required.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	

Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Apply for permit(s)	1.1. Confirm the scope and location of the work to be done 1.2. Identify the need for a work permit(s) for the work to be carried out. 1.3. Identify the type of work permit required. 1.4. Collate information required for the issue of the permit 1.5. Apply for the permit following the organisations requirements
2. Identify the scope of the permit.	2.1. Check that work to be done complies with the permit type. 2.2. Check that the scope and location of work comply with the

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ELEMENT	PERFORMANCE CRITERIA
	permit issued 2.3. Check that the hazard controls specified on the permit are consistent with the hazard analysis 2.4. Check that preparations specified on the permit have been completed 2.5. Sign onto/receive the permit.
3. Prepare for permitted work.	3.1. Maintain safe working conditions and environment by using available isolation procedures, safety equipment and emergency procedures. 3.2. Monitor plant conditions and hazards to ensure work under the permit remains safe. 3.3. Ensure that appropriate safety equipment and clothing are selected and worn as required by the permit and relevant procedures. 3.4. Inspect work area to ensure safety and compliance with permit requirements and procedures.
4. Work in accordance with an issued permit.	4.1. Use required hazard reduction/control measures. 4.2. Comply with requirements of the permit including safety observer if required. 4.3. Display issued permit on work site as required 4.4. Ensure compliance with scope, location and timeframe specified in the permit or seek re-authorisation as required 4.5. Suspend job and make work site safe before leaving job. 4.6. Formally seek and receive authorised extensions to the permit when required. 4.7. Give end of day status report to permit issuer.
5. Complete permit(s) to work.	5.1. Obtain new permit(s) or have existing permit(s) revalidated before work is recommenced. 5.2. Check the work conducted against the issued permit(s) to ensure that all the nominated work requirements have been satisfied. 5.3. Monitor general housekeeping to ensure that the site has been left in a clean and safe condition. 5.4. Ensure personal lockouts/tag outs/isolations are removed in accordance with procedures 5.5. Communicate status of the work conducted and the results of the permit to relevant personnel. 5.6. Complete documentation as required and have permit signed off when job is completed.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
Competence includes the ability to: • access and interpret information relevant to specific tasks (eg labels, MSDSs hazchem signs) • identify changes to conditions which may lead to the permit being revoked before the job is completed • describe and/or explain hazards associated with tasks covered by the permit, types of tests required for the issue of work permits - the types of tests to include, atmospheric/oxygen/breathability, flammability/explosivity, toxicity/TWA, temperature, humidity • the impact of the regulatory framework and organisation procedures under which the permit operates upon the particular job(s) requiring the permit. Language, literacy and numeracy requirements • This unit may require the ability to read and correctly interpret complex P&ID's; speak clearly and unambiguously in English; and to explain, describe and verify sometimes complex needs and issues. • Writing is required to the level of completing workplace forms. • Numeracy is required to the level of being able to correctly differentiate between high and low pressures and temperatures, voltages or masses.
Required knowledge:
Knowledge and understanding of the relevant OHS and environmental requirements, in particular those relating to various situations requiring work permits, with an ability to implement the requirements in a manner that is relevant to the job. Knowledge of the organisation's standard procedures and work instructions and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job. Sufficient knowledge of all types of permits is required to ensure work is not carried out without the correct permit. This includes recognizing hot work and confined spaces. Knowledge of regulatory frameworks should include: • licence requirements for the job, • company policy and procedures • permit control systems

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Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Assessment of this unit should demonstrate competence on actual plant and equipment in a work environment The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Simulation may be required to allow for assessment of parts of this unit. Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to distinguish between situations requiring the types of permit and to list the major requirements of each type of permit. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster. It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to: • provide reasons for a permit system • recognise the importance of different work permits • comply with permit conditions including the wearing of appropriate personal protective equipment (PPE) • take appropriate action to resolve faults or report faults to appropriate personnel • explain and implement incident response procedures. Consistent performance should be demonstrated, e.g. look to see that: • communications are timely and effective • deviations from permit conditions are recognised, reported, corrected and re-authorization arranged • actions specified in the permit/standard procedures are carried out • all safety procedures are followed.
Context of and specific resources	A holistic approach should be taken to the assessment.

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EVIDENCE GUIDE	
for assessment	Assessment will occur over a range of situations which may include disruptions to normal, smooth operation. Competence in this unit may be assessed: • on a plant/in the work place/a work situation • by using a suitable simulation based on the actual plant and including walk throughs of the relevant competency components and/or a range of case studies/scenarios and role plays • by questioning and using 'what if' scenarios both on the plant (during demonstration of normal operations and walk throughs of abnormal operations) and off the plant • through a combination of these techniques. These aspects may be best assessed using a range of simulations/scenarios/case studies and 'what ifs' as the stimulus with a walk through forming part of the response. These assessment activities should cover a range of problems, including new or unusual situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources. In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions. Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed. In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units. While oral assessments may be appropriate there needs to be a written record for audit purposes. This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions which will be used to probe the reasoning behind the observable actions will also be required to the extent that they form part of the assessment method.

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EVIDENCE GUIDE	
	Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.
Method of assessment	Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed and the safety standard required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version/version specified by the local regulatory authority must be used.
Context	This unit typically applies to all work done by maintenance staff and contractors, and also to any other non-process work performed on the plant. All work is to be conducted using the appropriate personal protective equipment. The types of work permits may include: • cold work/general permit to work • excavation • hot work • vehicle entry • minor repairs • working at heights • other special permits. Note that entry to a confined space is covered by *MSAPMPER205C Enter confined space*. The Australian Standard (*AS2865*) definition given for

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RANGE STATEMENT	
	confined space entry is used in this Training Package. All operations are performed in accordance with standard operating procedures (SOPs). Checks to ensure a workplace is safe may include: • process isolations complete • mechanical and electrical isolations in place • atmospheric testing complete and atmosphere safe. If it is not safe and cannot be made safe, then appropriate measures are implemented as per SOPs. • relevant personnel informed of work and agree that it is safe and appropriate to proceed.
Procedures	All operations are performed in accordance with procedures. Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include: • legislation/codes • OHS legislation, codes of practice and guidance material • EPA • National and Australian standards • licence and certification requirements • internal permit control system. • process isolations complete • mechanical and electrical isolations in place • atmospheric testing complete and atmosphere safe. If it is not safe and cannot be made safe, then appropriate measures are implemented as per SOPs. • relevant personnel informed of work and agree that it is safe and appropriate to proceed.
Information required for permit	Information required for a permit includes: • work description • tools to be used • process/methods of work/SOPs • MSDSs • JHA/JSA/SWMSs
Tools and equipment	This competency includes use of safety equipment and tools such as: • eye protection (eg goggles) • ear protection • gloves

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RANGE STATEMENT	
	• clothing • respiratory protection • helmets • safety footwear.
Hazards	Typical hazards include: • heat, smoke, dust or other atmospheric hazards • sharp edges, protrusions or obstructions • limited head spaces or overhangs • equipment or product mass • slippery surfaces, spills or leaks • noise, rotational equipment or vibration.
Display issued permit	Display issued permit on work site means to have the permit on the worksite and displayed/ready to be shown as required by the site/job requirements and may include: • displaying it in a provided mounting • having it accessible in a folder which is on the work site • having it folded in overall pockets in a manner which allows it to be readily shown on request.
Problems	'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical problems may include: • provision of the wrong permit • incorrect information being supplied with the permit • errors being made in the understanding of permit data • failure to correctly correspond to the requirements of the permit • failure to seek clarification when anomalies occur.
Variables	Key variables to be monitored include: • sites under which permit activities must be applied • type of permit to be executed • types of tools and equipment to be employed • size of work team • scope and urgency of work.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

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Unit Sector(s)

Unit Sector	

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSAPMPER201A Monitor and control work permits

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the monitoring of the operational conditions in which a permit to work has been issued, and the required activities and functions associated with the production/process of chemical, hydrocarbons, oil, and other process manufactured products. This role may be carried out by the standby person or other appropriately qualified persons.

While this competency carries with it high levels of responsibility the role is usually prescribed by the permit process and may be exercised by any competent operator.

Application of the Unit

Application of this unit

This competency applies to personnel who are required to monitor a work situation in which the activity is conducted under the auspices of a permit to work. During this activity the individual will monitor the work situation for conformance to the permit and will immediately intervene if the parameters of the permit are exceeded or work proceeds outside the boundaries set by the permit. It includes:

- identifying and understanding the requirements of the permit
- monitoring any changes in the conditions of work under the permit
- ensuring work sequences are followed as permitted by the permit
- constantly inspecting the site for changed work or site circumstances
- reporting any non-conformance with permit conditions
- withdrawing or causing work to cease outside permit conditions
- confirming conformance with permit conditions and reporting conclusion of activities.
-

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify and monitor permit conditions.	1.1 Identify permit requirements. 1.2 Monitor permit holder and conditions to ensure that the work being conducted conforms to the issued permit requirements. 1.3 Identify and communicate changes in the operating conditions or requirements of the permit to permit holders to ensure they are kept aware of any hazards.
2. Monitor work permit systems.	2.1 Control work activities to comply with the organisation or site work permit system and safety procedures. 2.2 Check and verify the permit holder's knowledge of the issued permit and its requirements before allowing any repair or maintenance work to be

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	undertaken on the production/process equipment. 2.3 Undertake site inspections to ensure that the work to be undertaken is in sequence and completed in a safe and coordinated manner. 2.4 Identify hazards, and confirm with those undertaking the permitted work that control measures, as defined in the permit are established.
3. Identify and action non-compliance.	3.1 Identify conditions of active permits. 3.2 Report and record incidents of non-compliance according to procedures. 3.3 Take corrective action upon incidences of non-compliance with permit conditions through the withdrawal or suspension of the issued permit.
4. Confirm compliance with permit.	4.1 Complete checklists in accordance with standard procedures. 4.2 Document and communicate findings to appropriate personnel.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of permit requirements sufficient to distinguish between situations requiring permits and then implementing the appropriate corrective action where required.

Knowledge of the organisation standard procedures and work instructions and relevant regulatory requirements, along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability toapply and/or explain:

- an awareness of hazards associated with the permit
- Australian Standard AS2865 - Safe working in a confined space and relevant legislation
- identification of container and goods coding and HAZCHEM markings
- production workflow sequences and requirements for working in confined spaces
- focus of operation of work systems and equipment

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- application of relevant agreements, codes of practice and other legislative requirements
- hazards of the materials and process and appropriate hazard control procedures
- identification and correct use of equipment, processes and procedures
- planning own work including predicting consequences and identifying improvements; as is relevant to the practical completion of the job.

Demonstration of competence in this unit should include knowledge of the following as appropriate to the process:

- blank/blind lists and P&IDs
- tagging procedures
- isolation procedures
- incident response procedures, including evacuation
- gas types, toxicity and explosivity and limits of each
- oxygen levels
- area knowledge including plant and processes
- permit types and limitations
- product tolerances and specifications
- static electricity and cathodic protection
- environmental hazards
- hot work protective measures
- columns
- vessels
- fire fighting equipment
- blinds/blanks
- pumps
- compressors
- prime movers
- valves.

An understanding of alarm and communication systems is required.

The regulatory framework to include:

- OHS
- EPA
- OHS authorities and NOHSC
- licence and certification requirements
- company policy and permit control systems.

Language, **literacy and numeracy requirements**

This unit requires the ability to:

- read and correctly interpret complex P&IDs
- speak clearly and unambiguously in English
- explain, describe and verify sometimes complex needs and issues.

Writing is required to the level of completing workplace forms and producing reports.

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Numeracy is required to the level of being able to correctly differentiate between high and low pressures and temperatures, voltages or masses.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

Assessment will occur using industrial equipment and will be undertaken in a work like environment

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Competence must be demonstrated in the ability to distinguish between situations requiring the major types of permit and to list the major requirements of each type of permit. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster.

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- provide reasons for a permit system
- recognise the importance of different work permits
- comply with permit conditions including the wearing of appropriate personal protective equipment (PPE)
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement incident response procedures.

Consistent performance should be demonstrated. For example, look to see that:

- communications are timely and effective
- deviations from permit conditions are recognised, reported, corrected and re-authorisation arranged
- action specified in the permit/standard procedures is carried out
- all safety procedures are followed.

Assessment method and context

The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which may include disruptions to normal, smooth operation.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Competence in this unit may be assessed:

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- on an operating plant over an extended period
- by using a suitable simulation based on the actual plant and including walk throughs of the relevant competency components and/or a range of case studies/scenarios and role plays
- by questioning and using 'what if' scenarios both on the plant (during demonstration of normal operations and walk throughs of abnormal operations) and off the plant
- through a combination of these techniques.

These aspects may be best assessed using a range of simulations/scenarios/case studies and 'what ifs' as the stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new or unusual situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed. In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions which will be used to probe the reasoning behind the observable actions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

The application of this unit is defined by the level and area of responsibility.

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Legislative and site specific safety procedures and/or requirements, including in hazard identification, assessment and application of control measures, must be met.

Compliance is required with:

legislation/codes:

- OHS
- EPA
- OHS authorities and NOHSC
- licence and certification requirements
- other relevant standards
- workplace specific permit control system.

Monitor means continual personnel presence to observe conditions of the workplace and work practices to ensure compliance with permit conditions. This may include:

- supervision/monitoring of contractors
- verification of permits, licences, tests
- document control
- compliance with legislation/codes.

Corrective action may include:

- ceasing job
- leaving the job site safe if it is safe and practical to do so
- report reason for ceasing job and request new permit when safe.

Indicative functions include:

- supervision/monitoring of contractors
- verification of permits, licences, tests
- document control
- compliance with legislation/codes.

This unit may be applied to either an individual or team related context within the workplace.

Procedures

All operations are performed in accordance with procedures.

Procedures cover all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include:

- legislation/codes
- OHS legislation, codes of practice and guidance material
- EPA
- National and Australian standards
- licence and certification requirements
- internal permit control system.
- process isolations complete
- mechanical and electrical isolations in place

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- atmospheric testing complete and atmosphere safe. If it is not safe and cannot be made safe, then appropriate measures are implemented as per SOPs
- relevant personnel informed of work and agree that it is safe and appropriate to proceed.

Tools and equipment

This competency includes use of equipment and tools such as:

- danger tags and lockouts
- out of service tags
- blinds/blanks
- blind/blank list
- gas testers and monitors
- lights
- ladders
- cathodic protection bonds
- barricades
- signage
- communications equipment
- process and equipment drawings.

The types of work permits may include:

- evacuation
- clearance
- hot work
- vehicle entry
- confined space
- minor repairs
- working at heights
- other special permits.

Safety equipment may include:

- eye protection (eg goggles)
- ear protection
- gloves
- clothing
- respirators and masks
- helmets.

Hazards

Typical hazards include:

- heat, smoke, dust or other atmospheric hazards
- sharp edges, protrusions or obstructions
- limited head spaces or overhangs
- equipment or product mass
- slippery surfaces, spills or leaks

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- noise, rotational equipment or vibration.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- provision of the wrong permit
- incorrect information being supplied with the permit
- errors being made in the understanding of permit data
- failure to correctly correspond to the requirements of the permit
- failure to seek clarification when anomalies occur.

Variables

Key variables to be monitored include:

- sites under which permit activities must be applied
- type of permit to be executed
- types of tools and equipment to be employed
- size of work team
- scope and urgency of work

Health, **Safety and Environment** (**HSE**)

All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Not applicable.

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MSAPMPER202A Observe permit work

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This competency covers the safety observer role for permits requiring a safety observer. It may be undertaken by a member of the work team or an operator may perform this role.

Application of the Unit

Application of the unit	This competency covers the knowledge and skills required for a safety observer (sometimes called a hole watcher or a fire watch). Safety observers can stop permit work, but do not have the authority to restart it. It includes: • understanding the permit system and the individual permit's requirements • observing work being performed • noting any change in conditions and taking required action.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

Employability Skills Information

Employability Skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for the job	1.1. Check the permit(s) issues are appropriate and sufficient for the work to be done 1.2. Prepare a rescue/incident response plan in accordance with procedures 1.3. Check plan is workable within the approved job procedures and issued permit(s) 1.4. Request revision of job procedures and or permit(s) to ensure rescue/incident response plan is practical.
2. Control the permit site.	2.1. Interpret the hazard controls required by the permit(s) 2.2. Check all hazard controls are complied with all the time 2.3. Maintain constant communication with workers 2.4. Control entry to and exit from the work site in accordance with the requirements of the permit(s) 2.5. Monitor the environment of the work site and adjacent areas 2.6. Monitor scope and location of work as defined by the permit(s) 2.7. Withdraw permit(s) and shut down work site if conditions vary from those required by the permit.
3. Take appropriate action for potential incident.	3.1. Ensure all required first response equipment is in the location specified by the permit(s) and is in working condition 3.2. Ensure all required monitoring is carried out as required by permit(s) 3.3. Withdraw permit and shut down work site in the event of an alarm or monitoring failure 3.4. Raise the alarm in the event of an incident 3.5. Implement rescue/incident response plan as required by procedures.
4. Complete safety observer role.	4.1. Hand over to oncoming safety observer before leaving role 4.2. Complete all required documentation and reports

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
This competency includes the following skills: • observation • decision making • communication • leadership
Required knowledge:
Competence in this unit includes the following knowledge: • hazards associated with the job and the plant • hazard analysis and control • HSE legislative requirements related to plant • incident response procedures • permit principles and procedures.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should demonstrate competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk throughs of the relevant competency components. Simulations may

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EVIDENCE GUIDE	
	also include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what if scenarios both on the plant (during demonstration of normal operations and walk throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to specify the requirements and then select the best solution to meet the necessary and desirable requirements.
Context of and specific resources for assessment	Assessment will require access to a plant or workplace over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with other relevant units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

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RANGE STATEMENT	
Context	This competency covers any work permits which requires a safety observer. Permits are called clearances by some organisations. Typical types of permit requiring a safety observer include: • excavation • hot work • confined space • other relevant permits. Requirements identified on the permit may include testing of atmospheric conditions, ventilation and control measures such as isolation, barriers, tag out/lockout signs, communications, incident response. A 'competent person' is a person who has, through a combination of training, education or experience, acquired knowledge and skills enabling that person to correctly perform a specified task. Safety structures and controls may include automatic plant shut down buttons, cords/lanyards, alarms, barriers, guards, earth leakage devices, tag out/lock out procedures, warning lights.
Incident response	The required incident response may include: • first response to fire • some initial rescues • first aid/CPR • other responses These responses are not included in this units of competency but are the subject of their own unit of competency.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit Sector	

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Competency field

Competency Field	

Co-requisite units

Co-requisite Units	*MSAPMPER200C*	*Work in accordance with an issued permit*

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MSAPMPER205C Enter confined space

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This competency covers the entry to confined spaces, for maintenance, servicing of vessels or other necessary reasons. Work in/entry to confined spaces shall conform to relevant legislation and AS2865, or its authorised update or replacement.

Application of the Unit

Application of the unit	This competency applies to persons who are required to enter confined space, for maintenance purposes, for cleaning, inspection or other reasons. It is required by all persons who are required to enter a confined space, as defined by the standard AS2865, or its authorised update or replacement. This unit includes: • preparing to enter the confined space • checking the preparations against the permit conditions • entering the confined space. AS2865 requires reassessment 'at appropriate intervals'. The industry regards reassessment on a two to three year cycle as good practice. It is expected that all standby persons will also be competent to enter confined space. See *MSAPMPER202A Observe permit work* for the standby person competency. The issuing of confined space permits is covered by *MSAPMPER300B Issue work permits*. Some sites and situations will require competency in associated units as a site corequisite. Some of these possible units are identified in the Overview of Assessment. These additional units should be accessed and may be combined

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	by the RTO as a skills set if appropriate.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MSAPMPER200C*	*Work in accordance with an issued permit*

Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Assess confined space for entry	1.1. Confirm and verify the purpose of the required entry. 1.2. Identify and assess hazards within/around the confined space. 1.3. Check a risk assessment associated with entry of the confined space has been conducted and documented. 1.4. Identify and document relevant controls.

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ELEMENT	PERFORMANCE CRITERIA
	1.5. Take appropriate steps to ensure confined space is ready for entry. 1.6. Check the incident/emergency response plan is appropriate to the job 1.7. Rehearse own role in an incident/emergency response 1.8. Confirm and verify that the conditions of the permit reflect the risk assessment 1.9. Check the confined space is ready for entry.
2. Use safety equipment and PPE	2.1. Secure work site 2.2. Select, fit and wear designated PPE. 2.3. Select, test and use required instruments and monitors. 2.4. Challenge test atmosphere/atmospheric monitoring instrument if required before entry. 2.5. Confirm test/monitoring results show entry is safe
3. Work in accordance with confined space requirements.	3.1. Enter confined space safely 3.2. Work in compliance with permit requirements. 3.3. Arrange re authorisation/reissue of permits as required. 3.4. Complete confined space working documentation. 3.5. Maintain communications with all relevant personnel. 3.6. Take appropriate action if there is a change in risk/work environment.
4. Conclude confined space operations in accordance with procedures.	4.1. Recover, clean, service and store equipment. 4.2. Complete required final documentation. 4.3. Report any issues.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
Competence includes the ability to: • access and interpret information relevant to specific tasks (eg labels, MSDSs hazchem

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REQUIRED SKILLS AND KNOWLEDGE

signs)
- access and apply hazard controls
- identify changes to conditions which may lead to the permit being revoked before the job is completed
- describe and/or explain hazards associated with tasks covered by the permit, types of tests required for the issue of work permits - the types of tests to include, atmospheric/oxygen/ breathability, flammability/explosivity, toxicity/TWA, temperature, humidity
- interpret and respond to gas test/monitoring results/information.
- identify a change in work conditions, possible new hazards and so the required hazard controls and obtain revalidation of permit
- implement hazard controls

Language, **literacy and numeracy requirements**

This unit requires the ability to:

- read and correctly interpret required documentation relevant to the entry
- speak clearly and unambiguously in English
- explain, describe and verify sometimes complex needs and issues
- understand the permit requirements.

Writing is required to the level of completing workplace forms and producing any required reports.

Numeracy is required to the level of being able to correctly differentiate between high and low pressures and temperatures, voltages or masses and interpret gas test/monitoring results.

Required knowledge:

Knowledge and understanding of the relevant OHS and environmental requirements, in particular those relating to various situations requiring work permits, with an ability to implement the requirements in a manner that is relevant to the job. Knowledge of the organisation's standard procedures and work instructions and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Sufficient knowledge of all types of permits is required to ensure work is not carried out without the correct written authority.

Knowledge of regulatory frameworks should include:

- OHS
- EPA
- OHS authorities and ASCC/NOHSC/state CSE regulations
- licence requirements
- company/organisation policy and permit control systems

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REQUIRED SKILLS AND KNOWLEDGE
• other relevant standards. Knowledge of and the application to the job of relevant legislation and AS2865/2009, or its authorised update or replacement, is essential. Australian Standard HB 213-2003 Guidelines for Safe Working in Confined Spaces, or its relevant replacement, is also a useful reference. Knowledge of the organisation's confined space procedures is required.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit may be undertaken as an individual unit or in combination with other relevant units. Other possible relevant units include: • RIIRIS201AConduct local risk control • RIIOHS204AWork safely at heights • MSAPMOHS200A Work safely • MSAPMOHS216A Operate breathing apparatus • MSAPMOHS217A Gas test atmospheres • MSAPMPER200B Work in accordance with an issued permit • MSAPMPER202A Observe permit work • PUASAR005A Undertake confined space rescue.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to distinguish between situations requiring different permits and to list the major applications and scope of each type of permit. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster. As working in a confined space is inherently hazardous it is essential that the worker be able to demonstrate: • recognition of a confined space • the ability to work within a confined space

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EVIDENCE GUIDE	
	• compliance with the permit conditions • recognition and control of atmospheric hazards • use of confined space entry and exit equipment relevant to the site/job • selection, use and maintenance of appropriate PPE • use of communication equipment and processes applicable to confined space work • completion of documents and records relevant to confined space work • understanding of and the ability to initiate incident/emergency response plan. Consistent performance should be demonstrated. For example, look to see that: • communications are timely and effective • deviations from permit conditions are recognised, reported and corrected and the permit is re-authorised or re-issued by competent person • actions specified in the permit/standard procedures are carried out • all safety procedures are followed.
Context of and specific resources for assessment	Competence in this unit should be determined by a practical demonstration of a confined space entry. This may be achieved: • by using a suitable simulation based on an actual plant AND • by questioning and using 'what if' scenarios In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/ simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions. This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to a plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions which will be used to probe the reasoning behind the observable actions will also be required to the extent that they form

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EVIDENCE GUIDE	
	part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.
Method of assessment	
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed and the safety standard required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicized wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version/version specified by the local regulatory authority must be used.
Confined space	The Australian standard (AS2865-2009) definition given for confined space is used in this Training Package, i.e.: 'An enclosed or partially enclosed space that is not intended or designed primarily for human occupancy, within which there is a risk of one or more of the following: (a) An oxygen concentration outside the safe oxygen range. (b) A concentration of airborne contaminant that may cause impairment, loss of consciousness or asphyxiation. (c) A concentration of flammable airborne contaminant that may cause injury from fire or explosion. (d) Engulfment in a stored free-flowing solid or a rising level of liquid that may cause suffocation or drowning.'
Entry	Entry to a confined space is defined by AS2865 as: 'when a person's head or upper body is within the boundary of the

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RANGE STATEMENT	
	confined space. NOTE: Inserting an arm for the purpose of atmospheric testing is not considered as entry to a confined space.'
Procedures	All operations are performed in accordance with procedures. Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include: • legislation/codes • OHS legislation, codes of practice and guidance material • EPA • National and Australian standards • licence and certification requirements where relevant • internal permit control system • process isolations complete • mechanical and electrical isolations in place • atmospheric testing complete and atmosphere safe or if not safe and cannot be made safe then appropriate measures are implemented as per procedures • relevant personnel informed of work and agree that it is safe and appropriate to proceed • communication protocols with particular reference to organisation confined space requirements.
Ready for entry	Checking the confined space is ready for entry includes checking: • isolations are complete and appropriate • isolation provide positive isolation • atmosphere is safe (or if necessary relevant measure are in place to ensure safe entry into an unsafe atmosphere) • safe entry and exit methods are in place • other items to ensure compliance with procedures, permits, relevant legislation and AS2865. Appropriate steps to be taken if the confined space is not ready for entry may include reporting deficiencies and refusing to enter the space.
Conditions of the permit	Conditions of the permit include all hazard controls. Permit conditions may require atmospheric testing/monitoring in which case MSAPMOHS217A Gas test atmospheres will also be required.

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RANGE STATEMENT	
Secure work site	Secure work site includes selecting and erecting/deploying required: • protective equipment, • apparatus • signs • barriers • etc as defined in the confined space entry permit requirements, AS2865 and other relevant requirements.
Designated PPE	Designated PPE (personal protective clothing and equipment) may include: • eye protection (e.g. goggles) • ear protection • gloves • clothing • respiratory protection • helmets • safety footwear • lifelines and harnesses • personal monitors and alarms • other relevant PPE as defined in the confined space entry procedures and permit requirements
Required instruments and monitors	Required instruments and monitors include: • instruments used for pre entry testing appropriate to the hazards • continuous monitors appropriate for the hazards • other devices used to test the confined space atmosphere: as required by the permit conditions
Re-authorisation/ reissue of permits	Re-authorisation/reissue of permits may be required when: • there is any change to work undertaken • the work situation changes • there is a gap in work continuity • the permit requires it • other site rules require it • other reasons
Confined space permit	The confined space permit should meet the requirements of AS2865 - 2009 or other appropriate standard

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RANGE STATEMENT	
Working documentation	Working documentation includes: • entry/exit/re-entry logs • other documentation required by AS2865 (eg s2.9) • other documentation required by the permit(s) • other documentation required by the site etc.
Appropriate action if there is a change in risk	Appropriate action if there is a change in risk includes any or all of: • seeking revalidation of the permit • evacuating the confined space • instigating/undertaking testing • raising the alarm • initiating the emergency/incident response plan • other relevant action.
Final documentation	Final documentation includes: • signing off of permit • documentation related to equipment used • other required records.
Reporting of issues	Reporting of issues includes: • feedback re the work and methods of improving the work process • signs and symptoms of operational stress, • equipment malfunctions • wear and tear of equipment, tools etc • condition of safety/rescue equipment • observations of the condition of the confined space within the level of competence of the person making the report.
Hazards	Typical may hazards include: • heat, smoke, dust or other atmospheric hazards • sharp edges, protrusions or obstructions • limited head spaces or overhangs • equipment or product mass • slippery surfaces, spills or leaks • noise, rotational equipment or vibration • high/low oxygen content • hazardous atmospheres (eg combustible, toxic) • entrapment • engulfment • heat stress

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RANGE STATEMENT	
	• claustrophobia • external hazards that may impact on the safety of those working in the confined space (eg exhaust fume, or other hazardous vapours, being drawn into the confined space by ventilation fans) • other hazards eg as identified in AS2865.
Variables	Key variables to be monitored include: • sites under which permit activities must be applied • type of permit(s) to be executed • types of tools and equipment to be employed • size of work team • scope and urgency of work • persons in the confined space/rotation of people in confined space • environmental conditions (eg weather).
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit Sector	

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSAPMPER300C Issue work permits

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This competency unit addresses the need for personnel who issue work permits to understand the permit system, know the limitations of each permit and make decisions regarding the need for and correct use of each permit. This competency unit includes the issue of any and all permits. It applies to the issuing of permits covering a single plant or plant area such as might be an operators scope of responsibility.

Application of the Unit

Application of the unit	This competency applies to personnel who are required to issues appropriate permits to work to persons conducting a variety of activities in workplace environments in which hazards exist or specific procedures need to followed and monitored to protect the safety of personnel and the integrity of plant or process. It includes: • reviewing the conditions under which the work will be undertaken • examining the site to determining the hazards and safety requirements applicable to the site • ensuring the appropriate permit(s) is (are) selected depending on the organisations procedures • determining the appropriate conditions for the permit(s) • raising, authorising and issuing the necessary permit(s) • monitoring compliance with the permit conditions • reporting any indiscretions or violations of permit conditions and where necessary revoking permits • managing the permit process especially in shift hand overs or extensions to work activities • withdrawing and signing off work permits on completion of the work and verification that the requirements of the permit have been complied with.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*RIIRIS201A*	*Conduct local risk control*

Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify need for work permit	1.1. Understand work permit system. 1.2. Identify and confirm with appropriate personnel the need for work permit. 1.3. Identify the correct permit for each situation.
2. Prepare work site for authorised work	2.1. Undertake an inspection of the work site. 2.2. Identify OHS and environmental requirements. 2.3. Conduct hazard identification and risk assessment. 2.4. Ensure work site is prepared in accordance specified work permit conditions. 2.5. Check permit conditions and report to appropriate personnel. 2.6. Identify need for and carry out testing in accordance with

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ELEMENT	PERFORMANCE CRITERIA
	standard operating procedures.
3. Raise and issue work permits	3.1. Ensure conditions are documented on permit. 3.2. Ensure appropriate testing carried out and results documented on permit. 3.3. Determine an appropriate validity period 3.4. Check that permit conditions are met (ie validate permit). 3.5. Complete and authorise permit. 3.6. Ensure recipient(s) is advised of and agrees to abide by the requirements of the permit(s). 3.7. Ensure recipient(s) signs permit(s).
4. Monitor work for compliance	4.1. Undertake regular site inspections. 4.2. Monitor conditions and work progress and respond appropriately to changing conditions and circumstances. 4.3. Ensure permit currency and revalidate as required. 4.4. Ensure permit is displayed in prominent position. 4.5. Identify and, act on incidences of non-compliance and report promptly to relevant personnel. 4.6. Report any issues which arise with regard to work under the permit in accordance with procedures.
5. Receive end of day report	5.1. Receive end of day report from permit recipients 5.2. Confirm job progress and status. 5.3. Revalidate/arrange for revalidation of permit as required 5.4. Confirm work area has been left safe 5.5. Handover ongoing permits and status of suspended permits to oncoming shift.
6. Close work permit	6.1. Inspect job status. 6.2. Check that work undertaken satisfies permit conditions. 6.3. Ensure that work site is ready for a safe return to working conditions. 6.4. Check required returns to work status have been completed. 6.5. Sign off documentation and close permit in accordance with standard operating procedures. 6.6. Communicate work site and process status to relevant personnel.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:

Competence includes the ability to select, apply and/or explain:
• appropriate PPE
• Australian Standard AS2865 -Confined Space
• Australian Standard AS1674.1 Safety in welding and allied processes (covers all hotn work)
• types of permits and what they cover
• hazards associated with each type of permit
• permit control system
• hazards of the area for which permit is being issued
• hazards that may be created by the interactions of the permit, the process and the plant area
• identification of container and goods coding and HAZCHEM markings
• production workflow sequences
• focus of operation of work systems and equipment
• application of relevant agreements, codes of practice and other legislative requirements
• methods of hazard analysis
• hazards of the materials and process and appropriate hazard control procedures, including hierarchy of control
• identification and correct use of equipment, processes and procedures
• selecting appropriate tests and knowing what the tests are for
• conducting and interpreting tests for contaminant gases and other hazards
• testing - types of testing may include:
  • atmospheric, including explosivity, O_2
  • flammability
  • toxicity
  • temperature
  • humidity
  • combustibles' oxygen, enriched or reduced
• estimating ventilation required for making vessels safe (eg for confined space entry, hot work)y including applying the formula for factors such as:
  • space turnover rate,
  • number of turnovers
• challenging/checking performance of monitoring and testing equipment against a standard sample
• supervision/monitoring of contractors.

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REQUIRED SKILLS AND KNOWLEDGE
Some sources of underpinning OHS knowledge include appropriate OHS and Dangerous Goods legislation, Australian Standards and Safework Australia, State or Territory codes such as: • NOHSC:1010 - National Standard for Plant • AS4024.1 Safeguarding of machinery - general principles • NOHSC: 1003 National exposure standards for atmospheric contaminants in the occupational environment. The regulatory framework to include: • OHS • EPA • OHS authorities and Safework Australia • licence and certification requirements • company policy and permit control systems • other relevant standards. This unit requires the ability to: • read and correctly interpret complex P&IDs • speak clearly and unambiguously in English • explain, describe and verify sometimes complex needs and issues.
Required knowledge:
Knowledge and understanding of the materials, equipment and process sufficient to recognise situations requiring different types of work permits and then implement the appropriate action. Knowledge of the organisation's standard procedures and work instructions and relevant regulatory requirements under which permit systems operate, along with the ability to implement them within appropriate time constraints and in a manner relevant to the job. Knowledge of the relevant requirements under AS2865. Writing is required to the level of completing workplace forms and producing reports. Numeracy is required to the level of being able to correctly differentiate between high and low pressures and temperatures, voltages or masses.

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and

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EVIDENCE GUIDE	
Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should demonstrate competence on actual plant and equipment in a work environment.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to distinguish between situations requiring the major types of permits and to list the major requirements of each type of permit. It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to: • correctly identify situations requiring work permits • identify and apply legislative requirements, relevant standards and codes of practice (which may be incorporated in the organisation's procedures) to the issuing of work permits • list the requirements of each type of permit • plan own work process within workplace procedures and explain the reasons for the steps in the process. Consistent performance should be demonstrated. For example, look to see that: • correct permit issued • hazards are identified and controlled in the permit by applying the hierarchy of control • required personal protective equipment (PPE) is specified • problems are anticipated • problems are efficiently resolved. These aspects may be best assessed using a range of scenarios/case studies/what ifs as the stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new or unusual situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.
Context of and specific resources	Assessors must be satisfied that the person can

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EVIDENCE GUIDE	
for assessment	consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. A holistic approach should be taken to the assessment. Competence in this unit may be assessed: • by use of a suitable simulation and/or a range of case studies/scenarios. Simulations should be based on the actual plant and will include walk throughs of the relevant competency components • through questioning and the use of "what if" scenarios both on the plant and off the plant. • by a combination of these techniques. In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions. Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed. This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.
Method of assessment	Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the

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EVIDENCE GUIDE	
	work being performedand the safety standard required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version/version specified by the local regulatory authority must be used.
Context	This competency covers the issue of any and all work permits. Permits are called clearances by some organisations. The types of permit include: • cold work • excavation • vehicle entry • minor repairs • working at heights • hot work • confined space • electrical • increased hazard • other relevant permits. Requirements identified on the permit may include testing of atmospheric conditions, ventilation and control measures such as isolation, barriers, tag out/lockout signs, communications, incident response. A 'competent person' is a person who has, through a combination of training, education or experience, acquired knowledge and skills enabling that person to correctly perform a specified task. Safety structures and controls may include automatic plant shut down buttons, cords/lanyards, alarms, barriers, guards, earth leakage devices, tag out/lock out procedures, warning lights.
The work permit system	The work permit system includes: • types of permits

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RANGE STATEMENT	
	• legislative/regulatory/standards framework • roles and responsibilities of parties under the permit system • equipment which can and cannot be used for types of permit • alternative ways of conducting a job
Confined space	The Australian standard (AS2865-2009) definition given for confined space is used in this Training Package, i.e.: 'An enclosed or partially enclosed space that is not intended or designed primarily for human occupancy, within which there is a risk of one or more of the following: (a) An oxygen concentration outside the safe oxygen range. (b) A concentration of airborne contaminant that may cause impairment, loss of consciousness or asphyxiation. (c) A concentration of flammable airborne contaminant that may cause injury from fire or explosion. (d) Engulfment in a stored free-flowing solid or a rising level of liquid that may cause suffocation or drowning.'
Procedures	All operations are performed in accordance with procedures. Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include: • OHS • EPA • OHS authorities and AASCC • Australian Standards • licence requirements • company policy and permit control systems • other relevant standards.
Preparation	Preparation of work site includes: • mechanical, electrical and other energy sources, and process isolations • de-energising all sources of energy/pressure • purging of lines • lock out/tag out procedures • blinding/blanking lines.
Tools and equipment	This competency includes use of equipment and tools such as: • writing instruments • computers and printers • calculators

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RANGE STATEMENT	
	• testing equipment.
Hazards	Typical hazards include: • unsafe conditions developing through failure to conform with the provisions of the permit • injuries to personnel • equipment failures • releases of toxic or noxious substances.
Returns to work status	Returns to work status may include: • de-isolation • removal of lockouts/tag outs • removal of drain covers • etc.
Problems	Anticipate and solve problems means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/ a solution recorded in the procedures. Typical process and product problems may include: • selection of the wrong permit • incorrect information being supplied with the permit • errors being made in the completion of permit data • failure to correctly correspond to the requirements of the permit • failure to seek clarification when anomalies occur.
Variables	Key variables to be monitored include: • types of permits being issued • permit issuing procedures • permit protocols for extended work activities beyond the end of shift • permit hand-over procedures.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

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Unit Sector(s)

Unit Sector	

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSAPMPER400A Coordinate permit process

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This competency covers the issuing and auditing of any and all permits across multiple plant areas or an entire site. It is typically undertaken by a senior process technician. This may be a routine job, a role in part of a job or a temporary role in a shut down or similar.

Application of the Unit

Application of the unit	This competency covers both the issuing of permits directly and also the coordination of permits issued by others. It focuses on potential conflicts between work being undertaken as well as checking that the permit system is being used correctly. It includes: • coordinating permits and the permit system • plant preparations and isolations and the preparation system • live auditing of permit issuers, permit recipients/holders • auditing of permit paper trails • overseeing and checking test regimes • quality checking of risk assessment • coordinating the issue of additional hazard control resources

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MSAPMPER300C*	*Issue work permits*

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Assess planned work for conflicts.	1.1. Identify all planned work for a time period 1.2. Determine the scope and HSE impacts of each planned job 1.3. Confirm hazard analysis and controls for each planned job 1.4. Compare hazard profiles for each planned job 1.5. Identify conflicts between planned jobs 1.6. Negotiate a solution between conflicts 1.7. Communicate results of negotiations to relevant stakeholders.
2. Issue required permits.	2.1. List those jobs which will be allowed to proceed in the time period 2.2. Confirm hazard controls required for these jobs 2.3. Identify jobs which have impacts across plant areas 2.4. Ensure controls and communications are adequate 2.5. Issue/cause to be issued required permits 2.6. Report as required by procedures.
3. Audit live permits.	3.1. Audit plant preparations 3.2. Audit permit issuing process 3.3. Check appropriate controls have been specified 3.4. Audit handover/sign on process 3.5. Audit work in progress for conformance to permit conditions 3.6. Audit work completion and hand back/closing process 3.7. Audit deisolation and return to work preparations 3.8. Take immediate and appropriate action on any problems found 3.9. Report on audit as required by procedures.

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ELEMENT	PERFORMANCE CRITERIA
4. Audit past permits.	4.1. Obtain relevant paper work 4.2. Check for conformance to procedures 4.3. Check for appropriateness of specified hazard controls 4.4. Identify any non-conformance 4.5. Identify systemic non-conformances 4.6. Take any immediate action which is appropriate 4.7. Report on audit as required by procedures.
5. Analyse audit findings.	5.1. Identify improvements to the permit system 5.2. Identify improvements to the implementation of the permit system 5.3. Suggest improvements to the permit system as appropriate 5.4. Suggests improvements to hazard analysis processes 5.5. Suggest improvements to the plant preparation/return to operations processes 5.6. Suggest improvements to hazard controls 5.7. Suggest training required as appropriate

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
This competency includes the following skills: • analysis • decision making • communication • priortisation • leadership • negotiation • problem solving
Required knowledge:
Competence in this unit includes the following knowledge: • the operations of the plant and each major unit in it

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REQUIRED SKILLS AND KNOWLEDGE
• hazards associated with all plant materials, processes and process conditions • hazard analysis and control • HSE legislative requirements related to plant • plant preparation procedures • auditing principles

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should demonstrate competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what if scenarios both on the plant (during demonstration of normal operations and walk throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to specify the requirements and then select the best solution to meet the necessary and desirable requirements.
Context of and specific resources for	Assessment will require access to an operating plant over an extended period of time, or a suitable method

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EVIDENCE GUIDE	
assessment	of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with other relevant units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This competency covers the issue of any and all work permits. Permits are called clearances by some organisations. The types of permit include: • cold work • excavation • vehicle entry • minor repairs • working at heights • hot work • confined space • electrical • increased hazard • other relevant permits. Requirements identified on the permit may include testing of atmospheric conditions, ventilation and control measures such as isolation, barriers, tag

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RANGE STATEMENT	
	out/lockout signs, communications, incident response. A 'competent person' is a person who has, through a combination of training, education or experience, acquired knowledge and skills enabling that person to correctly perform a specified task. Safety structures and controls may include automatic plant shut down buttons, cords/lanyards, alarms, barriers, guards, earth leakage devices, tag out/lock out procedures, warning lights.
Live permits	Live permits applies to work currently being done
Past permits	Past permits applies to any permit which has been handed back/closed.
Audit permits	Auditing of permits includes all of: • selecting an individual permit and following it through • spot checking any aspect of permits • intensively checking one aspect of the process with all permits on issue
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit Sector	

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSAPMSUP100A Apply workplace procedures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the skills and knowledge required to complete own work activities.

Application of the Unit

Application of this unit

This competency is typically performed by an operator working independently or in a team.

It includes:

- an awareness and application of workplace procedures
- an introduction to the industry
- knowledge of the company and the employee's role within the organisation.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Identify industry sector.	1.1 Identify the industry sector. 1.2 Recognise the major competitors in the industry and their products. 1.3 Identify career opportunities within the industry sector. 1.4 Explain the major external issues facing the industry.
2. Identify products and customers.	2.1 Identify company products. 2.2 Identify needs of external customers in line with organisation priorities. 2.3 Identify needs of internal customers. 2.4 Identify the role of quality processes in meeting product standards. 2.5 Identify your role in meeting customer requirements.
3. Recognise plant structure and processes.	3.1 Identify key production sites/areas. 3.2 Explain role of individual in organisational structure. 3.3 Describe the production process within own work area and relationship with other parts of the production process.
4. Identify workplace role and responsibilities.	4.1 Identify company objectives. 4.2 Identify organisational policies and guidelines in relation to job role. 4.3 Describe key responsibilities including OHS of own section/team and functional area. 4.4 Identify task requirements and work role.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	4.5 Explain individual role in achieving section/team, plant and company objectives.
5. Follow workplace procedures.	5.1 Identify existing sources of work instructions relevant to job role. 5.2 Follow work instructions in undertaking tasks. 5.3 Follow work instructions for recording process. 5.4 Seek advice from relevant personnel in clarifying work instructions when appropriate.
6. Recognise quality requirements.	6.1 Identify instances of variation in quality from specifications or work instructions. 6.2 Identify basic quality concepts to work activities. 6.3 Follow organisation procedures for reporting and managing variations. 6.4 Report problems with materials/product quality to supervisors. 6.5 Explain organisation procedures for identifying and suggesting improvements to improve product quality. 6.6 Work within the organisation quality system.
7. Plan and organise a personal daily routine	7.1 Plan daily routine to take into account rosters, industrial agreements and workplace procedures. 7.2 See clarification of requirements of tasks when appropriate. 7.3 Agree achievable time and other performance measures. 7.4 Complete tasks and identify and report variations to plan.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Competence includes an understanding of the products and functions of the organisation and the employee's role in completing tasks to meet customer, company and section/function objectives.

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Language, literacy and numeracy requirements

This unit requires the ability to read and understand information contained in typical workplace documents such as standard operating procedures, OHS requirements, and maintenance logs.

Writing is required to the level of completing workplace forms and records.

Basic numeracy is needed to the extent required by work instructions and procedures.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- understand relevant organisational policies, plans and procedures
- identify production processes relevant to work role
- identify work requirements and relevant workplace documents
- request advice, effectively question and follow instructions
- identify quality standards.

Consistent performance should be demonstrated. For example, look to see that:

- industry sector and major issues facing the industry are recognised
- main internal and external customers are identified
- role of individual and team/section is identified in terms of meeting company objectives (including safety objectives) and customer requirements
- relevant workplace policies and procedures are identified and followed
- tasks are performed in accordance with safety requirements/the quality system/workplace procedures
- appropriate documentation as defined by procedures is correctly completed.

Assessment method and context

Assessment will occur on-the-job or in a simulated workplace.

Competence in this unit may be assessed:

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- in a situation allowing the generation of evidence of the ability to recognise and resolve to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

It may be appropriate to assess this unit concurrently with relevant teamwork and communication units.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This is a general competency that is performed by all operators in all areas of operation.

In large plants with multiple processes, it may apply to just one process in a plant if those processes do not interact with each other.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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'Tools and equipment'

This competency includes use of:

- organisation goals, objectives and targets
- business and performance plans
- access and equity principles and practice
- equal opportunity and anti-discrimination principles and practice
- OHS policies, procedures and programs
- quality and continuous improvement processes and standards
- workplace procedures
- ethical standards
- workplace agreements and awards
- unions and industry associations.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'.

Unit Sector(s)

Not applicable.

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MSAPMSUP101A Clean workplace or equipment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers general housekeeping duties, as well as the cleaning of plant and equipment. This competency is typically demonstrated by all operators working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to personnel who are required to keep the work area, plant and equipment clean and tidy. The key factors are the identification, scheduling and performance of housekeeping requirements. This may include:

- identifying the range and scope of work required
- checking if any type of permit has been issued for the work
- knowing site safety and housekeeping standards
- adequately preparing to undertake the work, including obtaining all necessary safety equipment and PPE
- scheduling housekeeping duties
- handling chemicals and solvents safely
- keeping assigned plant and equipment clean.
- undertaking the work strictly in accordance with the provisions of any permit
- completing work in accordance with requirements
- moving work and waste materials to designated locations
- querying or raising matters about the scope of work if it varies from that normally undertaken
- completing the work in accordance with procedures and obtaining appropriate sign off as required.
-

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify housekeeping requirements.	1.1 Explain and understand site safety and housekeeping standards. 1.2 Undertake housekeeping inspection in accordance with procedures/work instructions. 1.3 Identify and schedule housekeeping requirements as appropriate.
2. Perform general housekeeping duties.	2.1 Keep designated work areas clean to organisation specific standards. 2.2 Keep designated work areas clear of obstructions. 2.3 Handle and use chemicals and solvents as per the manufacturer guidelines and company specifications. 2.4 Ensure work area is ready for next user. 2.5 Remove work materials to designated locations.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
3. Clean plant and equipment.	3.1 Keep assigned plant and equipment clean following established organisation procedures. 3.2 Perform specialised cleaning procedures as required. 3.3 Ensure that appropriate personal protective equipment is used as required.
4. Dispose of waste materials.	4.1 Correctly identify waste materials. 4.2 Remove waste materials to a designated location.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the process sufficient to recognise non-standard situations and then determine an appropriate action which is consistent with operating guidelines.

Knowledge of organisation standard procedures and work instructions and relevant regulatory requirements, along with the ability to implement them within appropriate time constraints and in a manner relevant to the operation of the process.

Competence includes the ability to:

- apply and describe:
- duty of care
- requirements for housekeeping process
- procedures for plant maintenance
- safe handling procedures
- the standard of cleanliness required.
- distinguish between:
- re-usable materials and waste
- routine and special cleaning needs.
- plan own work, including predicting consequences and identifying improvements
- use PPE
- safely handle products and materials
- read relevant safety information and apply safety precautions appropriate to the task/ relevant to the practical operation of the process.

Language, **literacy and numeracy requirements**

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This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, e.g. to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action.

Consistent performance should be demonstrated. For example, look to see that:

- early warning signs for work areas in need of cleaning are recognised
- work areas are kept tidy and clean
- equipment and/or materials is/are neatly stored, in a safe manner, in the correct location at all times when not in use
- equipment is always tidy and safe when in use.

Assessment method and context

Assessment will occur using industrial equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- in the operation of all ancillary equipment to the level required for this competency unit
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

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Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency unit may vary between organisations depending upon a range of practices and procedures, with consideration given to plant configuration and process.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- cleaning equipment and materials
- brooms
- shovels
- solvents
- waste containers
- safety equipment.

Hazards

Typical hazards include:

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- materials or equipment obstructing work areas
- heat, smoke, dust or other atmospheric hazards
- sharp edges, protrusions or obstructions
- limited head spaces or overhangs
- equipment or product mass
- slippery surfaces, spills or leaks
- noise, rotational equipment or vibration

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process and product problems may include:

- correct equipment not immediately available
- safety issues associated with housekeeping and/or cleaning
- ensuring that process aids rather than interferes with production.

Variables

Key variables to be monitored include:

- housekeeping and/or cleaning methods and procedures
- the type of tools and equipment used in special situations
- the use of personal protective equipment.
- correct use of tools
- waste collection and disposal
- conformance with frequency and quality of organisational reporting requirements
-

Unit Sector(s)

Not applicable.

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MSAPMSUP102A Communicate in the workplace

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit of competency covers receiving, relaying and recording written and oral messages and providing relevant information in response to requests, within time lines.

Application of the Unit

Application of this unit

This competency applies to operators who are required to receive, relay and record work related information as well as respond to information requests in the workplace.

The operator will:

- record received messages
- seek clarification, when necessary
- access needed information, as required
- relay the correct information to appropriate person/s.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Receive and relay messages	1.1 Confirm understanding of the message is correct. 1.2 Accurately record the message. 1.3 Relay message accurately to appropriate person or section within designated timelines.
2. Interpret messages.	2.1 Clarify message if necessary. 2.2 Take appropriate action.
3. Respond to information.	3.1 Acknowledge and understand the request for information. 3.2 Access information from appropriate sources. 3.3 Relay information to appropriate person or section.
4. Complete workplace forms.	4.1 Select appropriate form. 4.2 Assemble information required for form. 4.3 Complete form as required. 4.4 Submit form as required.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

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Knowledge and ability to implement organisation policies and procedures on workplace communication, including:

- types, purpose and importance of workplace documentation
- workplace codes, including numbers, symbols, signs, colours and other codes.

Competence also includes the ability to:

- listen attentively
- formulate questions to clarify work requirements or instructions
- establish effective workplace relationship with colleagues
- adapt communication to a range of social, cultural and ethnic backgrounds.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and understand information contained in typical workplace documents such as standard operating procedures, material safety data sheets, job cards, maintenance logs. Everyday workplace language is used, including some technical termsand mathematical language.

Writing is required to the level of completing workplace forms and records. Types of text may include short sentences, symbols, codes, signs, sketches and may be conveyed in printed form or screen based.

Basic numeracy is needed to the extent required by work instructions and procedures.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

In all cases it may be appropriate to assess this unit concurrently with relevant team work and communication units.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- provide and assess all required information and that the information provided both verbally and in writing is completed in a clear and concise manner that is easily understood by others and in accordance with workplace requirements.
- apply approved procedures.

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Consistent performance should be demonstrated. For example, look to see that:

- all information is provided in an efficient, effective, courteous and timely manner.

Assessment method and context

Assessment will occur on-the-job or in a simulated workplace.

Competence in this unit may be assessed:

- by observation and questioning to indicate understanding
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Reasonable adjustment of assessment tasks will be undertaken as required.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments.

Procedures

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All operations are performed in accordance with procedures. Procedures include:

- all relevant workplace procedures
- work instructions
- temporary instructions
- relevant industry and government codes and standards
- telephone protocol , including industry timelines in answering calls.

Messages

Messages includes the following as appropriate to workplace requirements:

- written
- oral
- electronic.

Tools and equipment

This competency includes use of equipment and tools such as:

- two way radio
- computer
- telephone.

Problems

Respond to routine problems means 'apply known solutions to a limited range of predictable problems'. Typical problems may include:

- missing/lost messages
- required information not available
- required equipment not available
- conflict of work priorities.

Appropriate action for non-routine problems may be reporting to designated person or other action specified in the procedures.

Unit Sector(s)

Not applicable.

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MSAPMSUP106A Work in a team

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the organisation of team activities to fit in with the scheduling of work to meet operational guidelines.

Application of the Unit

Application of this unit

This competency is typically performed by people who work within a team structure with limited discretionary powers

The worker will:

- plan and organise activities in accordance with instructions
- use appropriate interpersonal skills to contribute to effective teamwork
- seek assistance from other team members where appropriate
- complete logs and reports.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Individual organisations may choose to add prerequisites and corequisites relevant to their processes.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify work activities.	1.1 Identify task requirements of the team. 1.2 Identify individual tasks that are part of the team requirement. 1.3 Prioritise team and individual activities as directed.
2. Organise daily work plan.	2.1 Break work activities down into small achievable components. 2.2 Record activities as required by procedures/work instructions. 2.3 Seek assistance from other team members when difficulties in achieving allocated tasks arise.
3. Participate in a team.	3.1 Use interpersonal skills appropriate to the effective teamwork of the shift/crew/section within the workplace. 3.2 Acknowledge information and feedback provided by other team members in work group. 3.3 Acknowledge team roles and support team members in achieving their role. 3.4 Practise teamwork within and between groups to contribute to the achievement of company work

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	standards.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of organisation information systems, procedures and equipment sufficient to plan daily work activities in order to meet timelines.

Knowledge of organisation standard procedures and work instructions and relevant regulatory requirements, along with the ability to implement them within appropriate time constraints and in a manner relevant to the operation of the system.

Competence also includes the ability to:

- use effective communication techniques
- identify where teams fit into the organisational structure
- apply organisation quality and safety procedures
- complete required workplace documentation
- distinguish between urgent and non-urgent tasks.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and understand typical product specifications, job sheets, procedures and work instructions, material labels and safety information as provided.

Writing is required to the level of completing workplace forms.

Basic numeracy is required to the extent required by work instructions and procedures.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

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Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability toidentify work activities and prioritise work in order to meet timelines, whilst interacting as a member of a group.

Consistent performance should be demonstrated. For example, look to see that:

- activities are planned in accordance with instructions
- willingness to participate as part of a team is demonstrated
- relevant procedures are accessed and utilised in completing activities
- timelines are adhered to
- assistance is sought from relevant personnel when difficulties arise.

Assessment method and context

Assessment will occur on-the-job or in a simulated workplace.

Competence in this unit may be assessed:

- by observation over time on a processing plant or in a manufacturing environment
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

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The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments and sectors in the manufacturing industries.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as PPE.

Hazards

Typical workplace hazards include:

- chemicals and hazardous materials
- gases and liquids under pressure
- moving machinery
- materials handling
- working at heights, in confined spaces, or in environments subjected to heat, noise, dust or vapours.

Problems

Respond to routine problems means 'apply known solutions to a limited range of predictable problems'. Typical problems include:

- required information/materials not available
- required tool/equipment not available
- conflict of work priorities
- interpersonal conflict within the team.

Appropriate action for non-routine problems may be reported to designated person or other action specified in the procedures.

Unit Sector(s)

Not applicable.

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MSAPMSUP172A Identify and minimise environmental hazards

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the awareness of environmental issues and organisation environmental policies and procedures to minimise environmental threats.

Application of the Unit

Application of this unit

This competency is performed by all operators in all plants. It reflects the regulatory requirements and the industry's concern to operate in an environmentally friendly manner.

The operator will:

- identify activities/materials likely to be an environmental issue
- take the appropriate action on environmental issues as required.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Individual organisations may choose to add prerequisites and co-requisites relevant to their processes.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify potential environmental threats.	1.1 Recognise the type and severity of environmental threat posed by the materials and processes used for own work. 1.2. Identify ways materials used may enter the environment. 1.3. Identify sensitive features of the local environment and their impact on work practice and procedures.
2. Identify workplace procedures and policies to minimise environmental threats.	2.1 Identify workplace policy for environmental protection. 2.2. Identify in relevant standard operating procedures environmental protection measures appropriate for work. 2.3. Explain contact procedures for personnel involved in environmental response teams. 2.4. Recognise abnormal or unacceptable emission levels.
3. Follow procedures to minimise environmental threats.	3.1 Implement environmental protection measures in relevant procedures. 3.2. Report abnormal emissions/environmental issues to appropriate personnel. 3.3. Apply containment procedures in accordance with SOPs where appropriate. 3.4. Implement approved waste management procedures and practices. 3.5. Follow approved safety procedures and use

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	personal protective equipment as specified in procedures.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding is required of organisation environment protection systems, procedures and equipment sufficient to for work activities.

Knowledge is required of organisation standard procedures and work instructions and relevant regulatory requirements, along with the ability to implement them within appropriate time constraints and in a manner relevant to the operation of the system.

Competenceincludes an awareness of:

- internal environmental control standards
- severity of environmental risks from materials and work processes used
- likely impact on the environment of materials and process.

Competency also includes an awareness of the local environment and environmental issues such as:

- sensitive waterways/wetlands
- flows from the plant to the environment (eg through sandy soil, local creek)
- particular environmental threats posed by materials and processes used and the work practices required to minimise these threats.

Also required is the ability to:

- communicate using in-plant reporting systems - verbal, electronic and written
- initiate first response to an environmental incident in accordance with SOPs
- use containment equipment
- use personal protective equipment
- use other required resources.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and understand typical product specifications, job sheets, procedures and work instructions, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

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Basic numeracy is required to the extent required by work instructions and procedures.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability toidentify actual and potential environmental breaches as appropriate to the job level.

Consistent performance should be demonstrated. For example, look to see that:

- standard procedures are followed
- deviations from desired conditions are recognised
- action specified in the standard procedures is carried out
- the impact of work practices/actions on the environment is understood.

Assessment method and context

Assessment will occur using a simulation and will occur in a work like environment.

Competence in this unit may be assessed:

- by observation over time on a processing plant
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

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This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments and sectors in the industries. Responses are restricted to a 'first response' approach, including the notifying of appropriate organisation personnel.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- PPE
- spill kits.

Hazards

Typical workplace hazards include:

- chemicals and hazardous materials
- gases and liquids under pressure
- moving machinery
- materials handling.

Emissions/discharges

Typical emissions/discharges include:

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- noise
- light
- odour
- gas
- smoke vapour
- liquid and solids
- particulates
- fumes.

Problems

Respond to routine problems means 'apply known solutions to a limited range of predictable problems'. Typical problems include:

- required information/materials not available
- required tool/equipment not available

Appropriate action for non-routine problems may be reported to designated person or other action specified in the procedures.

Unit Sector(s)

Not applicable.

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MSAPMSUP200A Achieve work outcomes

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

The competency covers the ability to identify and implement actions to achieve workplace targets and to suggest improvements. This unit applies to all employees who may work either individually or as part of a team.

This unit does not cover maximisation of process/equipment efficiencies undertaken as part of the normal work role, which is covered in the relevant unit of competency.

Application of the Unit

Application of this unit

This competency is typically performed by an operator, perhaps working as part of a team, in achieving required work outcomes of quality and productivity within the scope of their job. They would be liaising and cooperating with other members of the work place.

The operator will:

- understand the production process
- recognise production inefficiencies within their area
- participate in and implement ways of improving production efficiencies.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

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Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify raw material components and their application in production.	1.1 Outline the properties of materials/components used in the production process. 1.2 Describe or construct a flow chart of the production process relevant to the area/plant. 1.3 Outline parts of the production process where extra care and attention are required. 1.4 Identify the safety and environmental requirements for relevant materials and processes.
2. Identify production targets in work area.	2.1 Identify production targets for work area and work roles taking account of OHS requirements. 2.2 Identify techniques used to measure production performance against workplace targets/standards.
3. Recognise key areas effecting production efficiencies.	3.1 Explain importance of reducing wastage of resources. 3.2 Identify potential sources of wastage/production inefficiencies. 3.3 Outline possible approaches to minimise wastage/ inefficiencies. 3.4 Demonstrate effective techniques to ensure wastage/

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	production minimisation within scope of job.
4. Implement actions to achieve production targets.	4.1 Identify the role of the individual and/or the team in achieving production targets. 4.2 Carry out required role to achieve production targets.
5. Participate in an improvement activity in accordance with organisation procedures.	5.1 Explain organisation procedures for identifying and suggesting improvements. 5.2 Explain the use of information in developing improvements related to work area. 5.3 Investigate a problem. 5.4 Suggest options for causes of problem. 5.5 Suggest options for improvement. 5.6 Discuss a proposed improvement with appropriate people.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the process, normal operating parameters and product quality to recognise non-standard situations. Knowledge of the relevant OHS and environmental requirements is required along with an ability to implement them in a manner which is relevant to determining the corrective action and provision of recommendations.

Thorough knowledge of organisation standard operating procedures is required. Some appreciation of business goals is required as a basis for decision-making and action.

Competence to include the ability toapply and explainsufficient for the identification and implementation of ways to maximise production efficiencies:

- relevant equipment and operational processes
- hazards associated with the process
- application of the hierarchy of control in controlling the hazards
- the safety implications of improving efficiencies
- organisation policies and procedures
- organisation goals, targets and measures
- organisation OHS, quality, and environmental requirements

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- individual and team roles and responsibilities in achieving safety, quality and environmental targets
- principles of decision making strategies and techniques
- organisation information systems and data collation
- industry codes and standards.

Language, literacy and numeracy requirements

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, e.g. to interpret quality data and graphs.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Consistent performance should be demonstrated. Critical aspects of competency include:

- hazards are identified and controlled
- production targets and measures are identified
- wastage and production inefficiencies for the functional area are identified
- work is conducted in a manner to minimise wastage/inefficiencies
- organisation procedures for identifying and suggesting improvements are followed
- effective participation in process improvement teams/activities is demonstrated.

Assessment method and context

Assessment will occur on-the-job or in a simulated workplace.

Competence in this unit may be assessed:

- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

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In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version will be used.

Context

This competency applies to all work environments and sectors within the industries.

This competency unit applies to a wide range of processes and equipment. In large plants with multiple processes, it may apply to more than one process if those processes interact with each other. It applies to all operators across all functions.

Properties of materials/components

Properties of materials/components includes:

- physical and chemical properties relevant to the process and the product
- hazardous properties.

Production targets/performance

Production targets/performance may include a range of factors where relevant to the job such as:

- volume
- quality

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- cost.

Wastage

Wastage may include:

- overproduction.
- waiting
- transporting
- inappropriate processing
- unnecessary inventory
- unnecessary/excess motion
- defects (quality).

Sources of information

Sources of information may include:

- yearly, monthly, weekly and daily production targets
- business objectives and goals
- control charts, run charts and graphs
- organisation manuals and procedures
- equipment specifications.

Inefficiencies

Sources of process inefficiencies and wastage may include:

- equipment downtime
- spillages
- leaks
- contamination
- raw material quality
- utilities usage
- productivity issues
- incorrect work allocation/priorities/planning
- incorrect processes/procedures.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This unit of competency includes use of equipment and tools such as:

- workplace forms and logs
- communication equipment for gathering and exchanging information such as telephones, two way radios, fax machines.

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Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical problems include:

- non-routine process and quality problems
- equipment selection, availability and failure
- teamwork and work allocation problems
- safety and emergency situations and incidents.
-

Unit Sector(s)

Not applicable.

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MSAPMSUP201A Receive or despatch goods

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the handling of materials by an operator as an adjunct to the job of making product. It applies to a limited range of materials. It is NOT intended to be an alternative warehousing competency.

This competency is typically performed by operators working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to operators who receive, process despatch orders, despatch products/materials and maintain records. The key factors are correctly identifying and selecting the goods to be despatched and ensuring they are despatched to the correct location.

It includes:

- checking order requests/consignment note documentation for products/materials to be despatched
- identifying and selecting the correct products/materials
- organising products/materials to be moved into the right place by the right time, using the appropriate handling equipment
- preparing products/materials for despatch
- completing and checking all documentation
- updating records.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

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This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify work requirements.	1.1 Read and interpret documentation. 1.2 Identify required schedules for receipt or despatch. 1.3 Identify correct product/material. 1.4 Plan work sequence using workplace and product knowledge. 1.5 Select appropriate materials handling equipment as required. 1.6 Identify OH&S requirements.
2. Move materials into/out of storage or from production.	2.1 Check paperwork and identity of materials. 2.2 Check for completeness and/or damage. 2.3 Take action on non-conforming products/materials. 2.4 Handle and move products/materials into/out of storage safely. 2.5 Store materials safely as necessary.
3. Prepare goods for	3.1 Identify and read workplace procedures for

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
despatch.	assembling and completing orders. 3.2 Select and check goods for despatch. against product/material knowledge, labels and other identification systems. 3.3 Sort, assemble and consolidate products as necessary. 3.4 Secure order and place in storage areas, in accordance with schedule. 3.5 Check order against despatch schedule and order form.
4. Complete materials movement records.	4.1 Complete materials movement records (in or out). 4.2 Update records as required. 4.3 Complete other paperwork and records as required.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the materials handling processes and requirements sufficient to recognise non-standard situations and then determine appropriate action which is consistent with operating guidelines is required.

Knowledge is required of the product/material, its properties and uses sufficient for correct receipt, storage and despatching. Knowledge of the relevant OHS and environmental requirements is required along with an ability to implement them in a manner which is relevant to the materials handled.

Competence includes the ability toapply and/or describe:

- product/material knowledge
- inventory and ordering systems
- transport requirements and restrictions for products/materials
- correct OHS procedures
- storage/handling principles and procedures
- material hazard properties and their implications for safe handling and storage
- significance of material to customers; transport requirements and restrictions for materials
- plan own work, including predicting consequences and identifying improvements

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- identify and describe own role and role of others involved directly in the processing of orders and despatching of products
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of problems such as product requirements and job priority as relevant to the practical completion of the job.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, e.g. to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability torecognise and analyse potential situations requiring action and then in implementing appropriate corrective action.

Consistent performance should be demonstrated. For example, look to see that:

- packaging standards are met consistently
- procedures and work instructions are read and interpreted correctly
- potential problems are recognisedand action is taken (ie, the problem is fixed or reported)
- action is taken to ensure problems are dealt with in a timely manner
- problems caused by product/material issues are recognised and an appropriate contribution made to a solution
- items initiated are followed through until final resolution has occurred.
- effective communication between team members, supervisors and other staff is maintained.

Competence must be demonstrated in the operation of all ancillary equipment to the level required for this competency unit.

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Assessment method and context

Assessment will occur using industrial equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- by observation over time on a processing plant
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency covers the handling of a limited range of products/materials and their moving into and out of a plant/storage. It is NOT intended for people who, as a major function, operate a warehouse. The appropriate Transport and Distribution competencies should be used here.

This competency may require the operation of forklift trucks or other regulated load shifting devices which are NOT included in this competency, and so would be a co-requisite competency.

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The terms order request, documentation, labels, transportation requirements 'paperwork' and 'records' mean any and all relevant information and data whether it is manual, paper based, electronic or verbal, either in person or by phone/radio.

This competency does not imply that moving materials into and from storage/plant are conducted equally, or even using similar techniques. Customers may be internal or external and the loading/unloading of products/materials may mean getting them onto/off a truck or simply from/to the next department.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- mobile plant/fork lifts
- manual handling equipment
- hand tools
- shrink wrappers
- tape machine labellers
- loose bulk packing equipment.
- computers, bar code readers
- bag filling equipment
- pallets
- wrapping machines
- personal protective equipment (PPE)
- distribution equipment, including A-frames, stillages, containers, elevated platforms and communication equipment.

Hazards

Typical hazards include:

- inappropriate movements and postures
- physical and atmospheric hazards of materials
- height or depth of storage receptacles
- stationary and moving machinery, parts or components
- noise, light, energy sources
- humidity, air temperature, radiant heat
- manual handling hazards.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- special storage requirements including moisture and contamination control
- handling of incomplete loads (either in or out)

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- handling of materials which do not meet specifications
- conflicting priorities
- incomplete or incorrect paperwork.
- product requirements
- job priority
- product/material variations.

Variables

Key variables to be monitored include:

- types of products or materials to be received/despatched
- handling heights
- types of equipment
- types of workplace documentation
- atmospheric conditions.
-

Unit Sector(s)

Not applicable.

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MSAPMSUP204A Pack products or materials

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the packaging of products/materials to prepare them for despatch, warehousing, or storage. This competency is typically performed by operators or store personnel working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to operators who package products and materials for despatch or storage. The key factors are correctly identifying the packaging requirements and using the technology required to package the goods/materials. It includes:

- identifying and interpreting the packaging requirements
- selecting the appropriate technology for packaging
- loading the product or material for on-forwarding
- packaging the load
- labelling the goods/materials after packaging.
- clearing up and leaving work area in a safe condition
- completing packaging documentation.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Prepare goods/materials for packaging.	1.1 Interpret packaging specifications. 1.2 Interpret order packaging documentation. 1.3 Select appropriate technology for packaging goods/materials. 1.4 Identify packaging materials and match specifications.
2. Package finished products.	2.1 Identify the nature of the product or material and the particular handling requirements. 2.2 Conduct process according to production specifications and organisational procedures. 2.3 Conduct equipment start up and run operation as necessary. 2.4 Employ ancillary equipment as necessary and use safe working procedures.
3. Stack, label and store finished products.	3.1 Consult company warehouse schedule or manifest to determine product or material, delivery, or storage and location requirements. 3.2 Label or mark products or materials following workplace labelling standards.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	3.3 Set up work area, handling and storage equipment taking account of safety and efficiency. 3.4 Store products where required making safe and efficient use of storage space. 3.5 Complete workplace records/documentation. 3.6 Attach invoices and picking slips (where required).
4. Clear work area.	4.1 Store unpacked products, products for packaging and handling equipment in appropriate areas. 4.2 Clean equipment and make ready for re-use. 4.3 Clean work area, making it safe and ready for the next user. 4.4 Report and document equipment faults.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the equipment and packaging processes sufficient to recognise potential problems and to take appropriate action.

Knowledge of organisation standard procedures and work instructions and relevant regulatory requirements, along with the ability to implement them within appropriate time constraints and in a manner relevant to the operation of the equipment and packaging process.

Competence includes the ability to apply and/or describe:

- packaging procedures and processes
- safe set up of individual work area
- storage requirements for safety and efficiency
- production workflow requirements for packaging
- packaging methods to minimise waste
- identification symbols
- correct OHS procedures
- approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
- waste management and importance of re-using non-conforming materials wherever possible

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- correct selection and use of equipment, materials, processes and procedures
- distinguish between causes of faults such as products, equipment, packaging materials and items of equipment.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- identify when the operator is able to rectify problems, when assistance is required and who is the appropriate source for assistance
- safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of problems such aspackaging and labelling requirements and goods being damaged after packaging.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product/material specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. x

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability torecognise and analyse potential situations requiring action and then in implementing appropriate corrective action.

Consistent performance should be demonstrated. For example, look to see that:

- packaging standards are met consistently
- procedures and work instructions are read and interpreted correctly
- problems are identified and action is taken (ie the problem is fixed or reported)
- all safety procedures are followed
- product/material damage due to handling errors is minimised
- mislabelling opportunities are minimised

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- problems relating to work are diagnosed and solved or reported
- waste is minimised
- effective communication between team members, supervisors and other staff is maintained.

Assessment method and context

Assessment will occur using industrial equipment and will be undertaken in a work-like environment

Competence in this unit may be assessed:

- by observation over time on a processing plant
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

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This competency applies to persons handling a range of products, materials technology and the varied range of process procedures within an organisation. It includes the operation of all relevant ancillary equipment.

The terms documentation, labels and records means any and all relevant information and data whether it is manual, paper based, electronic or verbal, either in person or by phone/radio.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include:

- original manufacturer instructions and guidelines for the use of equipment
- relevant procedures relating to safe working practices prescribed for the equipment, product or material
- local OHS legislation and/or regulations
- site-specific instructions based on production requirements.

Tools and equipment

This competency may include use of equipment and tools such as:

- mobile plant/fork lifts
- manual handling equipment
- hand tools
- shrink wrappers
- tape machine labellers
- loose bulk packing equipment.
- computers, bar code readers
- bag filling equipment
- pallets
- wrapping machines
- personal protective equipment (PPE)
- distribution equipment including A-frames, stillages, containers, elevated platforms and communication equipment.

Hazards

Typical hazards may include:

- inappropriate movements and postures
- physical and atmospheric hazards of materials
- height or depth of storage receptacles
- stationary and moving machinery, parts or components
- noise, light, energy sources
- humidity, air temperature, radiant heat
- manual handling hazards.

Problems

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'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- equipment malfunctions
- product specifications
- handling specifications
- insufficient space
- unusual size, shape or mass of products or materials
- insufficient goods to complete order
- conflicting priorities
- incomplete or incorrect paperwork.

Variables

Key variables to be monitored include:

- types of products or materials to be packed
- packing heights
- types of equipment
- types of workplace documentation
- atmospheric conditions
-

Unit Sector(s)

Not applicable.

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MSAPMSUP205A Transfer loads

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the movement of loads using cranes and gantries. It applies to all sectors of the industry. Licensing or certification may be required by local Worksafe or other regulatory authority.

Application of the Unit

Application of this unit

This competency applies to operators who move loads using cranes and gantries. The key factors are applying knowledge of the nature of the load to be shifted, safety precautions required and the capacity of load shifting equipment and relevant support structures. This competency is typically performed by operators working either independently or as part of a work team. It includes:

- planning the correct method to move the goods
- safely securing the materials/goods to be shifted
- ensuring that the movement pathway is clear of obstacles and personnel
- moving the goods safely without damage to the goods, personnel or equipment.

This unit does not cover the use of a forklift truck - see *TDTD1097 Operate a forklift*

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites, however appropriate licences may be required.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Plan operation.	1.1 Correctly identify products, goods or material to be relocated. 1.2 Identify load characteristics including mass, volume, shape, balance and dimensions. 1.3 Identify most efficient and appropriate piece of equipment to be used. 1.4 Estimate points of balance. 1.5 Consider effect of moving contents which may be loose, liquid, dangerous or hazardous. 1.6 Determine location of storage. 1.7 Carry out risk analysis for job. 1.8 Complete required hazard controls. 1.9 Identify most efficient and appropriate movement route.
2. Prepare for lift.	2.1 Select appropriate lifting equipment 2.2 Check and test lifting gear as required 2.3 Calculate safe working load (SWL) or working load limit (WLL). 2.4 Clarify any non-standard requirements.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	2.5 Report and replace any unsafe. 2.6 Secure movable/loose parts of load. 2.7 Attach load suitable for transfer.
3. Transfer load.	3.1 Prepare load destination to accept load. 3.2 Move load safely to required destination in accordance with planned procedure. 3.3 Use standard communication signals to coordinate safe movement of the load. 3.4 Remove equipment/gear/accessories safely from load. 3.5 Inspect equipment/gear/accessories for wear and damage, clean, maintain and store, and record usage and condition. 3.6 Complete site/job records.
4. Respond to routine problems.	4.1 Monitor transfer frequently and critically throughout load shifting using measured/indicated data and senses (eg sight, hearing) as appropriate. 4.2 Recognise transfer problems. 4.3 Identify and take action on causes of routine faults. 4.4 Log problems as required. 4.5 Identify non-routine process and quality problems and take appropriate action.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge of the materials handling processes and requirements sufficient to recognise non-standard situations and then determine appropriate action which is consistent with operating guidelines. Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or describe:

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- appropriate points for locations of slings
- estimation/ calculation of mass
- requirements for safe working loads (SWL) or working load limits (WLL)
- production workflow and requirements for load shifting.
- plan own work, including predicting consequences and identifying improvements
- identify when the operator is able to rectify problems, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the transferring loads with slings
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of problems such as:
- balance points and behaviour of suspended loads
- incorrect use of equipment.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to calculate loads and estimate balance points for slinging.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- apply approved procedures
- take appropriate action to resolve problems or report problems to appropriate personnel.

Consistent performance should be demonstrated. For example, look to see that

- standards are met consistently
- upstream and downstream communication is timely and effective

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- procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie the problem is fixed or reported)
- all safety procedures are followed.

Assessment method and context

Assessment will occur transferring industrial loads and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

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This competency applies to operators using load shifting equipment such as cranes and gantries, slings, ropes, shackles, eye bolts, spreader beams, equalising gear, clamps, pulley systems, winches, packs, rigging screws.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include:

- regulatory authority's licence or certification requirements
- original manufacturer instructions and guidelines for the safe use of the equipment
- relevant procedures relating to safe working practices prescribed for the equipment
- local OHS legislation and/or regulations
- site-specific instructions based on production requirements.

Tools and equipment

This competency includes use of equipment and tools such as:

- cranes and gantries
- slings, ropes, chains or nets
- block and tackle
- shackles, bolts or turnbuckles
- jemmy bars
- relevant personal protective equipment.

Hazards

Typical hazards include

- unpredicted movement of loads
- loose goods
- volatile or hazardous materials and products
- irregular shaped loads
- unlabelled goods, materials and products.

Hazard controls

Typical hazards controls include:

- obtaining a permit to work as required
- determining coordination requirements with other site personnel
- determining job method to include hazard prevention and controls,
- Australian standards for safety procedures, codes of practice and manufacturer specifications
- erecting barricades, warning signs, overhead protection to requirements.

Checking lifting gear

Checking lifting gear includes:

- checking pulleys and block and tackle for safe operation and load capacity.

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- checking ropes, cable, net and chain systems before use for safe condition and conformity to specification.
- conducting testing of ropes, cable, net and chain system when required to ensure safe operating capacity
- checking sling material for conformity with equipment and safety requirements.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- variations in load capacities of various sling materials
- frayed or damaged slings
- bolt or shackle failure
- lifting equipment failure.

Variables

Key variables to be monitored include.

- type and condition of slings or ropes
- type of load to be shifted
- physical dimensions
- physical or area hazards
- type of lifting equipment
- weather conditions (if outdoors)
- lighting and visibility in the loading/unloading area.
-

Unit Sector(s)

Not applicable.

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MSAPMSUP210A Process and record information

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit of competency covers the provision and processing of all relevant information by responding to the information requirements of the plant including the completion of all workplace documents and clearly and concisely providing relevant information to others.

Application of the Unit

Application of this unit

This competency applies to operators who are required to provide information, orally or in writing in a one on one situation or as part of a group discussion.

The operator would:

- complete appropriate workplace forms
- provide appropriate workplace and technical information within their area of expertise
- identify routine information requirements seeking clarification where necessary.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Access information.	1.1 Identify the need for information. 1.2 Request appropriate information. 1.3 Access information in accordance with procedures. 1.4 Comply with security procedures in accessing appropriate information.
2. Provide appropriate information.	2.1 Deal with enquiries promptly and courteously. 2.2 Establish details of enquiry by questioning and summarising. 2.3 Provide appropriate information relevant to enquirer's request. 2.4 Organise information clearly, concisely and logically. 2.5 Provide information in a form that is readily understood by others. 2.6 Provide information in a timely manner. 2.7 Redirect enquiries to relevant personnel for resolution where outside the operator's area of responsibility.
3. Give and follow routine instructions.	3.1 Give accurate, clear and concise instructions that are consistent with the skills of the receiver. 3.2 Ensure that interaction with others is efficient, effective, responsive, courteous and supportive. 3.3 Confirm that instructions are understood.

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	3.4 Follow prescribed and routine work related sequences.
4. Provide reports.	4.1 Complete all workplace reports clearly and accurately in accordance with procedures. 4.2 Report all relevant information clearly and concisely.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Competence includes the ability to:

- describe importance of workplace documentation in relation to job role
- apply organization, operational, quality and safety policies and procedures
- apply workplace codes such as numbers, symbols, signs, colour and other codes.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret work instructions, procedures, operating manuals, job card and other documents provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required to the extent required by work instructions and procedures.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

Assessment will occur on the job or in a simulated workplace. In all cases it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

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Competence must be demonstrated in the ability to provide and assess all required information and that the information provided both verbally and in writing is completed in a clear and concise manner, that is easily understood by others and in accordance with workplace requirements

Consistent performance should be demonstrated. For example, look to see that:

- reports and records are completed accurately, concisely and in accordance with procedures
- all information is provided in an efficient, effective, courteous and timely manner
- completion of shift handover, log books and company production records conveys all relevant information
- information sharing demonstrates effective communication processes such as turn-taking, participating in discussions and tolerating views of others in a way that contributes to the overall discussion
- notes of discussion are prepared so that they can be clearly interpreted by the receiver
- communication distinguishes between relevant and peripheral issues.

Assessment method and context

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. A holistic approach should be taken to the assessment.

Competence in this unit may be assessed:

- by observation and questioning to indicate understanding
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Reasonable adjustment of assessment tasks will be undertaken as required.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

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Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments and sectors within the industry.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes items of equipment such as:

- telephone
- two way radio
- computer equipment.

Information sources and plant documentation may include:

- operating procedures
- work instructions
- incident procedures
- operating manuals
- quality procedures
- training program contents/materials
- safety data sheets
- job cards
- maintenance logs
- non compliance reports
- incidence and accident reports
- permits
- schematics/process flows/engineering drawings.

Reports

Reports includes the following as appropriate to workplace requirements:

- oral

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- written
- electronic
- handovers (giving/receiving).

Problems

Respond to routine problems means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- difficulty in quickly locating information required
- missing forms, logbooks etc.
- conflicting work priorities
- delays in reporting of information
- information is inaccessible
- absence of approver/ other signatories
- breakdown of communication equipment.

Appropriate action for non-routine problems may be reported to designated person

or other action identified in the procedures.

Unit Sector(s)

Not applicable.

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MSAPMSUP230A Monitor process operations

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the use of production processing equipment.

This competency is typically performed by all operators working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to operators who use production processing equipment. Work involves the removal of products from equipment in strict conformity with standard operating procedures and routine quality inspection processes. The key factors are the successful operation of the equipment and the ability to recognise when the process is not working as intended. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- discussing work progress with other workers
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety (OHS) legislative responsibilities
- identifying production problems
- collecting and observing products from the production process
- collecting and disposing of waste materials
- checking materials to ensure no contamination
- identifying and taking action on routine process problems.
-

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites

This competency has no prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify equipment controls and procedures.	1.1 Identify work requirements from workplace approved operating procedures. 1.2 Check operating procedures and controls to identify approved adjustments and operating parameters. 1.3 Establish actions to be used in the event of faulty production from operating procedures. 1.4 Identify procedures for obtaining materials for the process. 1.5 Identify hazards and environmental issue that might surround the operation.
2. Get ready for work/job.	2.1 Assemble ancillary tools and equipment. 2.2 Identify inspection procedures. 2.3 Identify any finishing activities. 2.4 Plan to avoid any hazards connected with materials and process by observation of the equipment, workplace

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	reference materials, including materials safety data sheets and equipment instructions. 2.5 Take appropriate measures to minimise risks from the identified hazards. 2.6 Establish the location and function of equipment emergency stops and ensure guards are in place. 2.7 Identify and note requirements for checking: - materials inputs and outputs - ancillary supplies and equipment - product quality requirements for the relevant process stage(s). 2.8 Obtain or arrange access to any required supplementary equipment for product quality testing or routine lubrication and adjustment.
3. Maintain operations.	3.1 Check process operations, noting product quality, production outputs and waste, in accordance with workplace practices. 3.2 Collect product outputs, check for conformity, make adjustments to the equipment (where appropriate) and store product. 3.3 Collect material which is able to be reprocessed and reused, and deal with waste and scrap in accordance with workplace procedures (where applicable). 3.4 Check readouts against standard statistical process information and enter production data into the control system. 3.5 Clean up equipment and work area and manage waste in accordance with workplace procedures.
4. Identify product quality requirements.	4.1 Monitor process and note conditions which may affect product quality standards. 4.2 Report process variations within workplace procedures. 4.3 Note and implement authorised changes in standard operating procedures and specifications.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - contaminated materials/additives
  - product variations from specification.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

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It is essential that competence is demonstrated in the ability to:

- understand the importance of critical material properties and quantities
- recognise potential situations requiring action and implement appropriate action.

Consistent performance should be demonstrated. In particular look to see that production standards are met consistently.

Assessment method and context

Competence in this unit may be assessed:

- on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

General context

This competency applies to the operation of various forms of production equipment in all work environments and sectors within the process manufacturing industry. It includes the operation of all relevant additional equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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Equipment and tools

This competency includes equipment and tools such as:

- hand carts and trolleys
- knives and other bag opening equipment
- hoists/lifting equipment not requiring any special permits or licences
- basic hand tools required for opening of material packaging
- relevant personal protective equipment.

Hazards

Typical hazards include:

- automated or rotating equipment
- dusts/vapours
- hazardous materials
- manual handling hazards
- knife hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- equipment malfunctions
- product jamming or sticking
- power failures
- air, oil or lubricant difficulties.

Typical product problems include:

- variations in materials
- contamination of materials
- malformed or incomplete products.

All operations are performed in accordance with procedures.

Unit Sector(s)

Not applicable.

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MSAPMSUP240A Undertake minor maintenance

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit applies to operators who are involved in providing basic maintenance and the resolving of routine problems to procedures. It does not cover activities normally requiring traditional trade training.

Application of the Unit

Application of this unit

In a typical scenario a plant operator does minor maintenance activities on the plant and equipment being operated. For instance the pressure drop across a filter unit may be high, indicating the filter cartridge needs changing. The operator takes the filter unit out of operation, cleans the unit, uses the correct spanner to open the lid, installs a fresh cartridge, closes the unit using the spanner again, then cleans up the area and disposes of the spent cartridge. Typically this sort of maintenance will be done on the plant and will not require workshop type facilities.

The operator will:

- be aware of and contribute to a safe working environment
- identify and check equipment for faults
- perform basic maintenance to procedures
- complete logs and reports.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify maintenance requirements.	1.1 Identify equipment variations/irregularities using observed data and plant records. 1.2 Assess the urgency/priority of the situation. 1.3 Identify appropriate corrective action. 1.4 Identify correct tools and materials. 1.5 Assess the impact of the maintenance activity and communicate to appropriate personnel. 1.6 Identify hazards and risk controls. 1.7 Identify work permit requirements.
2. Prepare for maintenance activity.	2.1 Ensure equipment is turned off and isolated as required. 2.2 Clear the area of obstructions and hazardous materials. 2.3 Obtain appropriate tools, parts, materials and procedures. 2.4 Obtain the appropriate work permits and adhere to the requirements. 2.5 Communicate the impending maintenance activity to the appropriate personnel.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
3. Perform maintenance activity.	3.1 Access all relevant information. 3.2 Undertake maintenance activity according to procedures. 3.3 Use tools and maintenance techniques correctly. 3.4 Restore equipment to normal working condition. 3.5 Leave the work area in a clean and safe condition. 3.6 Ensure permits are signed off as appropriate.
4. Test equipment.	4.1 Test equipment according to procedures. 4.2 Return equipment to service. 4.3 Ensure equipment meets normal operating requirements.
5 Record maintenance activity.	5.1 Complete maintenance logs/plant history records. 5.2 Report maintenance activity to relevant personnel. 5.3 Identify and report outstanding maintenance requirements to relevant personnel.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of equipment operation and maintenance practices sufficient to recognise fault and no-fault conditions in standard and non-standard situations and then determine appropriate action which is consistent with operational guidelines is required.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls applied to the process. Application of approved hazard control, safety procedures, use of PPE in relation to handling materials, equipment operation and clean up.

Knowledge as a basis for solving maintenance problems, including:

- principles of operation of the equipment to be maintained
- function and troubleshooting of major internal components and their problems
- appropriate testing procedures and use of equipment for a range of equipment faults

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- typical causes of equipment failures and the service conditions which may increase maintenance
- types and nature of maintenance (preventative, predictive, corrective) uses, benefits and limitations
- urgency and timeliness factors in maintenance
- maintenance planning/scheduling/records systems
- identification of tools, materials and spare parts
- basic techniques for using and handling tools
- physical measurement, alignment and clearance principles.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical equipment specifications schematics and diagrams.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, to interpret plant data and maintenance schedules.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Where the completion of this unit requires working under a permit/clearance, then competency must also be established in *PMAPER200C Work in accordance with an issued permit*, or other appropriate unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- understand the procedures and know the importance of critical operational systems
- recognise potential situations requiring action and then implement appropriate action.

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Consistent performance should be demonstrated. For example, look to see that:

- early warning signs of equipment in need of attention/with potential problems are recognised
- appropriate equipment tests are undertaken and analysed appropriately
- proposals for equipment repair are based upon the most appropriate and cost effective method to return equipment to full performance in a timely manner
- maintenance activities are completed safely and to procedures.

Assessment method and context

Assessment will occur on industrial equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

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Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments and sectors within the industry. It does not include maintenance that would require trade level skills. It is not intended that this competency would cover maintenance that is carried out in a workshop.

Procedures

All operations are performed in accordance with procedures.

Procedures mean all relevant workplace procedures, work instructions, temporary instructions, standard operating procedures, plant description manuals, manufacturer instructions, specifications, service manuals, machine circuit diagrams for hydraulic/pneumatic and electrical/electronic circuits and relevant industry and government codes and standards.

Maintenance activities

This competency unit includes minor maintenance such as the following:

- operational maintenance (eg connection-disconnection of hoses, greasing, lubrication and lubricant systems, adjusting sealing glands, cleaning and changing filters, 'nipping up' flanges)
- general cleaning
- removal and replacement (eg gland packing, changing blades or cutters, replacing gaskets, replacing /maintaining seals, changing filter elements, servicing strainers).

Tools and equipment

This competency includes use of equipment and tools such as:

- hand tools
- specialised tools
- measuring and aligning equipment.

Hazards

Typical hazards include:

- rotating and moving machinery
- process materials, solids, liquids and gases under pressure or flowing
- hot surfaces or materials
- temporary connections or by-passes
- electrical, hydraulic or pneumatic energy sources
- out of specification operation.

Problems

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'. Typical process and product problems may include:

- out-of-specification product or variations
- response of equipment to materials variations

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- equipment in need of maintenance.

Variables

Key variables to be monitored include:

- equipment performance (eg speed, output, variations)
- equipment component performance
- sequences and timing of operations
- materials changes (desired and not desired).

Data and Records

Typical information sources, observed data and plant records may include:

- plant data
- log sheets
- operational and performance reports
- physical aspects such as noise, smell, feel and pressure condition monitoring information
- planned maintenance schedules
- procedures
- manufacturer specifications, instructions, service manuals and other information.
-

Unit Sector(s)

Not applicable.

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MSAPMSUP273A Handle goods

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the handling of materials by an operator as an adjunct to the job of making product. It applies to a limited range of materials. It is NOT intended to be an alternative warehousing competency.

Application of the Unit

Application of this unit

This competency applies to operators who receive or despatch goods from either internal or external sources. The key factors are checking and inspecting goods for conformity to documentation. This competency is typically performed by operators working either independently or as part of a work team. It includes:

- reading and interpreting receipt documentation
- identifying and following procedures for checking goods
- identifying and reporting non-conforming goods
- completing workplace documentation.

This unit does not cover the use of forklift trucks or other load shifting devices. See *PMPSUP205A Transfer loads* or *TDTD1097 Operate a forklift* as appropriate.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Identify requirements.	1.1 Interpret order/paperwork. 1.2 Check and take action on special requirements as needed. 1.3 Check identity of materials. 1.4 Check for completeness and damage. 1.5 Take action on non-conforming materials/loads.
2. Move materials to/from storage/production.	2.1 Select items to be moved based on job requirements and procedures/work instructions. 2.2 Load materials according to standard procedures. 2.3 Move materials as needed. 2.4 Store/place materials safely.
3. Complete documentation.	3.1 Complete material movement records. 3.2 Update stock records as required. 3.3 Complete other paperwork and records as required.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge of goods and materials sufficient to recognise variance from specifications and then determine appropriate action that is consistent with operating guidelines.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain procedures for receiving/despatch of goods, and reconciliation of orders and invoices
- apply and/or describe:
  - storage/handling principles and procedures
  - material hazard properties and their implications for safe handling and storage
  - significance of material to customers
  - transport requirements and restrictions for materials.
- plan own work, including predicting consequences and identifying improvements
- identify when the operator is able to rectify problems, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the receiving of goods
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of problems such as incorrect/incomplete paperwork; wrong goods.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

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Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve problems or report problems to appropriate personnel.

Consistent performance should be demonstrated. For example, look to see that

- upstream and downstream communication is timely and effective
- procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Assessment method and context

Assessment will occur using industrial goods and will be undertaken in a work-like environment

Competence in this unit may be assessed:

- on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

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Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to operators working either independently or as part of a work team.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- goods identification numbers and codes
- manifests
- picking slips, merchandising transfers, stock requisitions and bar codes
- manufacturer specifications
- supplier and/or client instructions.

Hazards

Typical hazards include:

- stationary and moving machinery, parts or components
- noise, light, energy sources
- humidity, air temperature, radiant heat.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- incorrect goods delivered
- incomplete orders and shipments
- inappropriate packaging
- wrong or incomplete labling
- incomplete or incorrect paperwork
- special storage requirements including moisture and contamination control
- handling of incomplete loads (either in or out)
- handling of materials which do not meet specifications
- resolving conflicting priorities

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- ensuring the correct material arrives at the correct place at the right time.

Variables

Key variables to be monitored include:

- compliance with 'receiving' procedures
- appropriate handling of incoming goods
- completion of documentation
- condition of packaging and lifting or moving locations
- availability of lifting/moving equipment
- unloading practices
- variations in provider documentation.
-

Unit Sector(s)

Not applicable.

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MSAPMSUP280A Manage conflict at work

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the management of conflict in a range of situations where personal responsibility is required.

Application of the Unit

Application of this unit

This competency applies to operators who come into contact with other people either directly or indirectly and who are required to liaise and cooperate with other members of the team. It is applicable to the interaction between co-workers, between staff and customer/client, or between staff and supervisor.

This competency is typically performed working either independently or as part of a work team. The operator would:

- determine, from their behaviour or language, the other person's degree of concern or anxiety
- consider the reasons for the person's concerns and behaviour
- work towards finding common ground and opportunities for problem resolution
- consider possible courses of action and the other person's reaction to them
- take appropriate steps to resolve the conflict
- seek external assistance where the conflict could be or is escalating.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify potential sources of conflict.	1.1 Identify actions which are likely to promote a reaction in others. 1.2 Assess the other persons needs and/or concerns. 1.3 Assess ability to respond to the other persons needs. 1.4 Recognise possible causes of conflict. 1.5 Identify potential conflict situations.
2. Identify range of alternative approaches.	2.1 Discuss with the other person their needs and concerns. 2.2 Discuss with other person own needs and concerns. 2.3 Identify a possible strategy through which these requirements may be achieved. 2.4 Develop a range of alternative strategies for achieving goals.
3. Resolve conflicts.	3.1 Identify areas of common ground or objectives that can be mutually supported. 3.2 Agree on a strategy which will meet the majority of objectives for both parties.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	3.3 Implement the strategy. 3.4 Check that the agreed requirements are being met and that conflict has been resolved.
4. Respond to problems.	4.1 Identify possible problems in the conflict management process. 4.2 Determine problems needing action. 4.3 Determine possible causes. 4.4 Rectify problem using appropriate solution within area of responsibility. 4.5 Follow through items initiated until final resolution has occurred. 4.6 Report problems outside area of responsibility to designated person.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the process sufficient to recognise potential problems and not allow them to escalate to a conflict situation.

Knowledge of organisation standard procedures and work instructions and relevant regulatory requirements, along with the ability to implement them within appropriate time constraints and in a manner relevant to the operation of the process.

Competence also includes the ability to:

- apply mapping of conflict situations
- design options
- apply negotiation skills
- apply mediation skills
- distinguish betweenpotential and actual conflict situations
- identify causes of conflict situations.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and understand relevant procedures and work instructions as provided to operators.

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Writing is required to the level of completing workplace forms.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

In all cases it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that the process be understood and that the importance of interpersonal relationships is known. Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action.

Consistent performance should be demonstrated. For example, look to see that:

- willingness to resolve situations is demonstrated
- statements are used that calmly reflect the requirements of participants
- statements focus on issues and facts, not people and personalities.

Assessment method and context

Assessment for this unit of competency will be on a processing plant or in a manufacturing environment.

Competence in this unit may be assessed:

- by observation or questioning to indicate understanding
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

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This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments in the process manufacturing industries.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes all such items of equipment and unit operations which form part of the human interaction system.

These may include:

- telephones, two-way radios
- emails, faxes
- memos, letters or emails
- verbal, face-to-face communications.

Hazards

Typical workplace hazards include:

- chemical and hazardous materials
- gases and liquids under pressure
- moving machinery
- materials handling

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- working at heights, in confined spaces, or in environments subjected to heat, noise, dust or vapours.

Problems

Respond to routine problems means 'apply known solutions to a limited range of predictable problems'. Typical problems may include:

- anger or aggression arising from industrial relations matters
- disagreements over processes or work practices
- variations in opinions about circumstances or events
- interpersonal disputes arising from changes in personal circumstances.

Appropriate action for non-routine problems may be reporting to designated person or other action specified in the procedures.

Unit Sector(s)

Not applicable.

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MSAPMSUP291A Participate in continuous improvement

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit applies to all employees who are required to be involved in process improvement initiatives.

Application of the Unit

Application of this unit

This competency is typically performed by an operator working independently or in a team.

The operator will:

- have knowledge of customers and suppliers
- identify areas of improvement
- identify strategies for improvement
- work with colleagues to implement changes for improvement to work processes.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify customers and suppliers.	1.1 Identify internal and external customers and suppliers. 1.2 Identify individual requirements. 1.3 Identify your role in meeting customer requirements.
2. Identify areas for improvement.	2.1 Identify issues affecting output and quality. 2.2 Identify instances of variation. 2.3 Follow enterprise procedures/work instructions for reporting and managing variations. 2.4 Record non-conformance in accordance with company requirements.
3. Identify strategies for improvement.	3.1 Analyse problems/areas for improvement. 3.2 Explain the use of information in developing improvements. 3.3 Use appropriate quality tools and techniques for identifying causes of problem and areas for improvement. 3.4 Suggest options for improvement. 3.5 Discuss a proposed improvement with others in a team.
4. Participate in a team to implement an improvement proposal.	4.1 Implement changes in system and procedures. 4.2 Monitor performance improvements. 4.3 Evaluate results of improvements with others in a team.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the process, normal operating parameters and product quality to recognise non-standard situations. Knowledge of the relevant OHS and environmental requirements is required along with an ability to implement them in a manner which is relevant to determining the corrective action and provision of recommendations.

Thorough knowledge of organisation standard operating procedures is required. Some appreciation of business goals is required as a basis for decision-making and action.

Competence to include the ability toapply and explain:

- principles of operation
- principles of recording and reporting
- analytical problem solving techniques.

Competence to include the ability to distinguish between causes of problems such as:

- process
- maintenance
- materials
- operations.

relevant to the ability to improve processes and procedures at that level.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg to interpret quality data and graphs.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

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It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- appropriate documenting of the quality improvement process is undertaken
- enterprise procedures for identifying and suggesting improvements are followed
- the operator is able to participate in a team discussion
- enterprise procedures for implementing improvement proposals are followed
- standards are met consistently.

Consistent performance should be demonstrated.

Assessment method and context

Assessment will occur on-the-job or in a simulated workplace.

Competence in this unit may be assessed:

- in a situation allowing the generation of evidence of the ability to respond to problems
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

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Context

This competency applies to all work environments and sectors within the industries.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- workplace forms and logs
- communication equipment for gathering and exchanging information, such as telephones, two-way radios, fax machines, email.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process problems may include:

- process and quality problems
- equipment selection, availability and failure
- teamwork and work allocation problems
- safety and emergency situations and incidents.
-

Unit Sector(s)

Not applicable.

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MSAPMSUP292A Sample and test materials and product

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the taking of routine samples and the conducting of simple tests.

Application of the Unit

Application of this unit

This competency applies to operators who are required to undertake the routine sampling and testing in the workplace. Testing will typically also be done in the workplace or in a 'factory laboratory' (or bench) adjacent to/in the factory. Tests will be simple, routine tests to procedure. This competency is typically performed by operators working either independently or as part of a work team. The operator:

- takes the sample
- performs the test
- makes a simple interpretation of the test results
- takes actions specified based on the test results
- completes logs and reports.

More advanced sampling and testing should use the relevant units from *PML04 Laboratory Operations Training Package*.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Take sample.	1.1 Determine type of sample and sampling equipment required. 1.2 Check sampling equipment is clean and in good order. 1.3 Take sample(s) of required type(s), from the required place(s) and at the required time(s) and place in required container(s). 1.4 Label sample(s) to procedure. 1.5 Carry sample(s) to required place.
2. Complete test.	2.1 Check test required from procedures/work instruction. 2.2 Check sample identification and integrity. 2.3 Check test equipment is clean, in good order and within calibration. 2.4 Complete test(s) required as per standard procedures/ instructions.
3. Interpret results and take action.	3.1 Note anything about sample, equipment or the test itself which may have caused it to give a bad result. 3.2 Compare results to specification.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	3.3 Take action appropriate to the test results and any other observations.
4. Complete sample and test cycle.	4.1 Complete required records. 4.2 Store and/or dispose of sample as required. 4.3 Clean all equipment and leave ready for next sample/test.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the sampling and testing techniques used sufficient to recognise a suspicious test result cause by a fault in these areas.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Knowledge and skills in sampling and testing sufficient for consistent and meaningful test results including:

- basic principles of taking the particular sample
- basic principles of the particular test
- sample techniques and requirements
- test methods used and critical factors leading to good/poor test results.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical sampling and testing methods/procedures and to read and interpret numbers or other test result data.

Writing is required to the level of completing workplace forms and labelling samples.

Basic numeracy is required to read and interpret test results and undertake minor data manipulation such as might be required for the test, test interpretation or reporting.

Evidence Guide

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- take a sample correctly
- undertake tests with adequate reproducibility
- select and use the appropriate procedures.

Assessment method and context

Assessment will occur in a factory testing environment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- by using appropriate, industrial testing regimes
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

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Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that will affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the range of sampling and testing which may be carried out in a plant/factory, or in a manufacturing laboratory. It typically applies to operators who carry out a narrow range of tests as part of their job.

It does NOT include testing which would normally be conducted in a laboratory, nor operators carrying out a wide range of testing which is a significant part of their job role. These competencies are more properly covered by *PMLTEST300A Perform basic tests* or other units from the Laboratory Operations Training Package.

The tasks covered by this competency include:

- receiving, handling and storing samples
- preparing for sample collection
- performing sample collection
- performing sample preparation
- performing tests
- recording results.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical problems include:

- correct sampling technique
- test equipment condition/calibration
- consistent test technique according to standard procedure
- correct recording of result
- interpretation of result and the initiation of appropriate action
- correct retention/disposal of sample/test materials.
-

Unit Sector(s)

Not applicable.

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MSAPMSUP300A Identify and implement opportunities to maximise production efficiencies

Modification History

Release 2 - Error in title of prerequisite unit corrected - Equivalent. No change to the prerequisite.

Unit Descriptor

Unit descriptor

This competency covers the ability to identify, monitor and participate in strategies to improve production efficiencies to meet set targets. It applies to all employees who are required to provide input into process improvement initiatives. The competency is typically performed by an experienced operator, team leader or supervisor.

Application of the Unit

Application of this unit

This unit covers the improvement of production such as occurs in the workplace but does not cover maximisation of process/equipment efficiencies undertaken as part of the operator's normal role, which is covered in the relevant operation/production competency unit.

The plant operator would:

- identify variances from production targets
- monitor performance against targets
- participate in and implement areas for improving process efficiencies.

Generally the plant operator would be part of a team in developing strategies to improve process efficiencies and may be expected to perform all parts of this unit. At all times they would be liaising and cooperating with other members of the team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSAPMSUP200A Achieve work outcomes

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify production performance.	1.1 Identify production targets for work area and work roles taking account of OHS. 1.2 Identify techniques used to measure production performance against targets/standards. 1.3 Record production performance in accordance with enterprise procedures.
2. Recognise issues that effect production process efficiencies.	2.1 Identify issues affecting output and quality. 2.2 Identify potential/actual sources of wastage. 2.3 Identify hazards and required controls associated with the process. 2.4 Identify strategies to minimise production inefficiencies without sacrificing OHS.
3. Monitor and measure performance against targets.	3.1 Monitor performance of process/equipment/raw material usage against targets. 3.2 Identify variations from targets and divergence from trends. 3.3 Use appropriate techniques to monitor actual performance against target. 3.4 Identify factors inhibiting performance.

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
4. Participate in developing methods for improving process efficiencies.	4.1 Analyse problems/areas for improvement in process efficiencies. 4.2 Utilise appropriate problem solving tools and techniques for identifying areas for improvement. 4.3 Identify and take into account external factors. 4.4 Identify required changes to process, standards and procedures. 4.5 Recommend strategies for improvement to relevant personnel.
5. Participate in implementing process improvement strategies.	5.1 Implement developed strategies to minimise production inefficiencies and wastage. 5.2 Monitor performance improvement recommendations. 5.3 Evaluate results of improvements. 5.4 Report results to relevant personnel.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of process sufficient to recognise deviations from target and recommend improvement strategies.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls applied to the process. Application of approved hazard control, safety procedures, use of PPE in relation to handling materials, equipment operation and clean up.

Knowledge as a basis for identifying opportunities and recommending and implementing strategies, including:

- principles of the operation of the equipment
- relevant equipment and operational processes
- hazards associated with the process
- application of the hierarchy of control in controlling the hazards
- enterprise policies and procedures

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- enterprise goals, targets and measures
- enterprise quality, OHS and environmental requirements
- obligations of employers under OHS legislation as applied to the production process
- enterprise information systems and data collation
- industry codes and standards.

Competence also includes the ability to:

- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical process documentation and charts.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, to the level of identifying deviation from targets.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- understand the procedures and know the importance of critical operational systems
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. For example, look to see that:

- production targets are identified and performance monitored against targets
- potential and actual issues/problems/hazards are recognised and clarified
- appropriate strategies are recommended to improve efficiency and productivity within team/department to achieve targets
- safety and environmental implications of recommendations are recognised and addressed
- participation in implementing strategies to improve process efficiencies is demonstrated.

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Assessment method and context

Assessment will occur on-the-job, in a work-like environment or in a simulated workplace.

Competence in this unit may be assessed:

- on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing the generation of evidence of the ability to recognise, anticipate and solve problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

The competency unit applies to a wide range of processes and equipment. In large plants with multiple processes, it may apply to more than one process if those processes interact with each other. It applies to all operators across all functions.

Procedures

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All operations are performed in accordance with procedures.

Procedures mean all relevant workplace procedures, work instructions, temporary instructions, standard operating procedures and relevant industry and government codes and standards.

Sources of information

Sources of information may include:

- yearly, monthly, weekly and daily production targets
- business objectives and goals
- control charts, run charts and graphs
- enterprise manuals and procedures
- equipment specifications.

Sources of process inefficiencies and wastage

Sources of process inefficiencies and wastage may include:

- equipment downtime
- spillages
- leaks
- contamination
- raw material quality
- utilities usage
- productivity issues
- incorrect work allocation/priorities/planning
- incorrect processes/procedures.

Problems

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'. Typical process and product problems may include:

- non-routine process and quality problems
- equipment selection, availability and failure
- teamwork and work allocation problems
- safety and emergency situations and incidents.
-

Unit Sector(s)

Not applicable.

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MSAPMSUP301A Apply HACCP to the workplace

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency applies to senior operators working in sectors that make products which come into contact with food and beverages

This competency covers the application of a HACCP-based approach to food and beverage related products.

Acronyms used in this competency:

- CCP - critical control points
- CCF - critical control factors
- CCL - critical control limits
- HACCP - hazard analysis critical control points
- HAT - hazard analysis table.
-

Application of the Unit

Application of this unit

This competency unit covers the development/modification of a HACCP/HAT to the manufacture of products to be used in contact with food, beverages or pharmaceuticals. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

This competency applies to all work environments and sectors within the industry where the product comes into contact with food, beverages or pharmaceuticals or otherwise requires 'food standard' to be maintained. Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

It includes:

- applying the 'seven principles' of HACCP
- developing a HAT from a HACCP
- developing a new HACCP as part of a HACCP team
- making changes to existing HACCPs/HATs, resulting from process/material changes (provided such changes are not major requiring a complete new analysis)

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- helping operators to apply and use the HACCP/HAT in their routine work.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	**PERFORMANCE CRITERIA**
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Apply a HAT to an existing process.	1.1 Identify CCPs. 1.2 Recognise CCFs which are outside of or approaching CCLs. 1.3 Describe hazard related to CCFs and CCLs. 1.4 Implement corrective action as per HAT.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
2. Develop/modify a HACCP.	2.1 Conduct a hazard analysis. 2.2 Determine the CCPs. 2.3 Establish critical limits. 2.4 Establish/modify a system to monitor control of the CCPs. 2.5 Establish the corrective action to be taken when monitoring indicates that a particular CCP is not under control. 2.6 Establish procedures for verification to confirm that the HACCPsystem is working effectively. 2.7 Establish/modify documentation concerning all procedures and records appropriate to these principles and their application.
3. Interpret HACCP/HAT to another worker.	3.1 Explain the purpose and rationale of HACCP. 3.2 Identify CCPs, CCFs and CCLs. 3.3 Describe indicators of CCFs not within their CCLs. 3.4 Describe impact of non-conformances. 3.5 Demonstrate corrective action. 3.6 Monitor worker implement.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the materials, equipment and process sufficient to recognise HACCP/HAT issues and take appropriate corrective action.

Knowledge of organisation standard procedures, HACCPs and HATs and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes knowledge of:

- the HACCP approach
- HAT relevance to routine production
- impacts of variations in materials, process and product on HACCP

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- the relevance of the Codex Alimentarius to food/beverage/pharmaceutical packaging

and the ability to:

- apply the Codex Alimentarius to the food industry
- analyse process and material variations in terms of the HACCPand determine appropriate action(s)
- develop a new HACCP as part of a team
- recognise the need to modify an existing HACCP/HAT and make minor modifications.

Language, **literacy and numeracy requirements**

This unit requires the ability to read, interpret and write technical information and explain it to operators.

Writing is required to the level of writing technical reports and HACCP/HAT tables.

Numeracy is also required, eg to interpret quantitative data, make comparisons and interpretations.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- recognise potential situations requiring action
- implement appropriate action
- understand the procedures
- explain the importance of CCPs, CCFs and CCLs.

Consistent performance should be demonstrated. For example, look to see that HACCP standards are met consistently.

Assessment method and context

Assessment will occur on a processing plant or in a manufacturing environment and will be undertaken in a work-like manner.

Competence in this unit may be assessed:

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- by using an appropriate, industrial plant/process
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and solve problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency covers the development/modification of a HACCP/HAT to the manufacture of products to be used in contact with food, beverages or pharmaceuticals. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

This competency applies to all work environments and sectors within the process manufacturing industries where the product comes into contact with food, beverages or pharmaceuticals. Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Hazards

Typical hazards are:

- biological
- chemical
- physical
- product contamination
- material contamination.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

- recognising CCFs approaching the CCLs.
- determining corrective action from HAT
- applying HACCP principles to situations not directly covered by HAT
- recognising the need for a new/modified HACCP/HAT
- modifying HACCP/HAT to meet changes circumstances.
-

Unit Sector(s)

Not applicable.

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MSAPMSUP303A Identify equipment faults

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit requires the application of planning, technical knowledge and skills to check and isolate routine and non-routine equipment faults used in production and report on the status of equipment. It applies to all sectors of the industry.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement

Application of the Unit

Application of this unit

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the identification and isolation of faults in equipment. The key factors are the planning, checking and identification of routine and non-routine faults, in order to return the equipment to production.

The operator will:

- identify and plan scope of equipment checks
- check settings, adjustments and performance of equipment
- check materials for conformity to job requirements
- identify and isolate faults in equipment
- propose solutions and carry out solutions within scope of authority
- complete logs and reports.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

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This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify scope of operational check.	1.1 Identify and classify equipment components and operating systems. 1.2 Match appropriate tests and procedures to the equipment operating systems. 1.3 Identify special test procedures and parameters in manufacturer's specifications and procedures. 1.4 Explain the operating principles of hydraulic, pneumatic, mechanical and electrical/electronic systems as related to workplace equipment. 1.5 Implement measures to control identified hazards in line with procedures and duty of care. 1.6 Observe and undertake checks on the physical condition of equipment as per procedures. 1.7 Record preliminary observations. 1.8 Discuss test procedures with appropriate personnel and obtain necessary permission where required.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
2. Plan operational checks.	2.1 Check specifications and notes from preliminary observations and identify areas to be clarified. 2.2 Plan testing sequence/s noting areas where results and observations should be recorded. 2.3 Identify safe area for testing. 2.4 Make arrangements for any additional resources (including other employees).
3. Check unit through full operational range.	3.1 Undertake testing, observing relevant safety and operational requirements. 3.2 Confirm results and findings.
4. Identify fault and/or formulate recommendations.	4.1 Identify impact of fault on work schedule. 4.2 Record proposals for equipment repair based on faults found, cost/time implications and workplace approval systems. 4.3 Explain report to relevant workplace personnel including any options and recommendations. 4.4 Undertake repairs where appropriate in accordance with procedures.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of equipment operation and maintenance practices sufficient to recognise fault and no-fault conditions in standard and non-standard situations and then determine appropriate action which is consistent with operational guidelines is required.

Knowledge of organization procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls applied to the process. Application of approved hazard control, safety procedures, use of PPE in relation to handling materials, equipment operation and clean up.

Knowledge as a basis for solving processing and material problems, including:

- principles of the operation of the equipment to be maintained
- functions and troubleshooting of internal components and their problems

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- routine and non-routine causes of equipment failures and the service conditions which may increase maintenance
- maintenance techniques, (eg reactive maintenance, predictive and preventative operational maintenance)
- appropriate testing procedures and use of equipment for a range of equipment faults
- operating principles for mechanical, hydraulic, pneumatic, electrical/electronic systems
- urgency and timeliness factors in planning maintenance activities in relation to production requirements
- collection, analysis and reporting of data.

Competence also includes the ability to:

- identify and select testing methods based on cost and time effectiveness
- conduct inspections, checks and tests on equipment as appropriate
- read and interpret circuit diagrams for mechanical, hydraulic, pneumatic and electrical/electronic operating systems
- use technical information and manufacturer information to locate relevant data
- interpret technical specifications and manufacturer instructions
- ensure workplace is safe for testing and maintenance of equipment
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information
- apply safety precautions appropriate to the task.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical equipment specifications schematics and diagrams.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, to the level of calculating equipment throughputs and performance.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

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It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- understand the procedures and know the importance of critical operational systems
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. For example, look to see that:

- early warning signs of equipment in need of attention/with potential problems are recognised
- appropriate tests are undertaken and tests are analysed appropriately
- proposals for equipment repair are based upon the most appropriate and cost effective method to return equipment to full performance in a timely manner
- items initiated are followed through until final resolution has occurred.

Assessment method and context

It is preferred that assessment takes place on industrial equipment in a work environment.

Competence in this unit may be assessed:

- on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing the generation of evidence of the ability to recognise, anticipate and solve problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

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The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments and sectors within the industry. It does not include maintenance that would require trade level skills. It is not intended that this competency would cover maintenance that is carried on in a workshop.

Procedures

All operations are performed in accordance with procedures.

Procedures mean all relevant workplace procedures, work instructions, temporary instructions, standard operating procedures, plant description manuals, manufacturer's instructions, specifications, service manuals, machine circuit diagrams for hydraulic/pneumatic and electrical/electronic circuits and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- hand tools specific for the task
- product testing equipment (eg flowmeter, scales, tape measure, micrometer, caliper, ultrasonic thickness)
- machinery measuring equipment (eg vibration meter, tachometer, current tester, thermal imaging, temperature gauge)
- measuring and aligning equipment.

Hazards

Typical hazards include:

- rotating and moving machinery
- process materials, solids, fluids and gases under pressure or flowing
- temporary connections or by-passes
- electrical, hydraulic or pneumatic energy sources
- out-of-specification operation.

Problems

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'. Typical process and product problems may include:

- out-of-specification product or variations
- response of equipment to materials variations
- new or changed materials
- changed equipment settings (eg higher speed or throughput)
- equipment in need of maintenance

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- procedures requiring update or modification.

Variables

Key variables to be monitored include:

- equipment performance (eg speed, output, variations)
- equipment component performance
- sequences and timing of operations
- materials changes (desired and not desired).

Data and Records

Typical information sources, observed data and plant records may include:

- plant data
- log sheets
- operational and performance reports
- physical aspects such as noise, smell, feel and pressure condition monitoring information
- planned maintenance schedules
- procedures.
-

Unit Sector(s)

Not applicable.

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MSAPMSUP309A Maintain and organise workplace records

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit covers the maintenance of workplace records in paper or electronic form. It may include sample products or materials for testing or quality purposes.

Application of the Unit

Application of this unit

This unit applies to employees who are required to maintain and organise workplace records.

The competency is normally used within approved workplace routines, methods and procedures. Discretion and judgement are required in the selection of equipment, work organisation, services and the allocation of work tasks within agreed time frames.

The employee will::

- identify and handle records in accordance with enterprise procedures
- track location of records
- apply security controls to ensure the integrity of records is not compromised
- maintain workplace records systems
- identify problems and take appropriate action.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify records to be stored.	1.1 Identify purpose(s) of records to be maintained in relation to customer requirements, quality system or production requirements. 1.2 Identify requirements for completion of workplace records in accordance with workplace procedures. 1.3 Record and collate information ensuring appropriate information and any samples are included in an appropriate manner.
2. Maintain document filing arrangements.	2.1 Identify organisation system for records. 2.2 File records following workplace conventions. 2.3 Deal with obsolete or non-conforming records following workplace procedures.
3. Respond to information requests.	3.1 Interpret requests for information and prioritise. 3.2 Identify information requested and provide information within required workplace policies and time frames.
4. Organise file movements.	4.1 Identify files to be relocated. 4.2 Complete records of movement and file following workplace procedures.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
5. Maintain security of workplace records.	5.1 Identify security requirements for workplace records. 5.2 Maintain security arrangements for files. 5.3 Notify (any) security breaches to appropriate personnel.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge of organisation standard procedures, work instructions and relevant regulatory requirements along with the ability to implement them within appropriate time constraints relevant to the job.

Knowledge and skills in organising and maintaining a records system, including:

- identification and correct use of record keeping processes and procedures
- records generated at various stages of the production workflow and records access requirements
- focus of operation of record systems and equipment
- importance of records held and relevant procedures to maintain records to minimise time delays in accessing records
- maintenance of information for suppliers, customers and the enterprise.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- identify and describe own role and role of other employees in maintaining workplace records.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets, work instructions and material labels as provided to operators.

Writing is required to the level of completing workplace forms and reports.

Numeracy is also required to the extent required by production data, work instructions and procedures.

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Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- identify and implement appropriate work processes for the filing and retrieval of workplace information
- identify and take appropriate action on problems and potential problems.

Consistent performance should be demonstrated. For example, look to see that:

- records are consistently filed and accessed in accordance with workplace procedures
- security precautions appropriate to the records are applied at all times.

Assessment method and context

Assessment will occur on-the-job or in a simulated workplace.

Competence in this unit may be assessed:

- by direct observation and accessing the workplace records system
- in a situation allowing the generation of evidence of the ability to recognise, anticipate and solve problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

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This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments in the industry.

Work is governed by established workplace procedures, and extent of authority for adjustments and other work activities are defined

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Documentation

This unit of competency includes sources of documentation such as:

- production reports
- job specifications
- production capability statements/specifications
- relevant workplace procedures and policies
- quality standards
- enterprise manuals
- machine or equipment instructions and readouts
- manufacturer specifications
- materials safety data sheets
- reliability, human resource, financial and production information
- relevant agreements, codes of practice and other legislative requirements.

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Filing systems may be manual or computerised.

Problems

Anticipate and solve problems means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/s recorded in the procedures.

Typical problems may include:

- lost files
- misfiling
- poor controls
- insufficient space/storage facilities
- incorrect destruction of records.

Appropriate action for problems outside of area of responsibility may be reported to

an appropriate person.

Appropriate action for solving problems within area of responsibility includes asking

questions and seeking assistance from appropriate persons/sources

Variables

Key variables to be monitored include:

- retention schedules
- records movements and location.
-

Unit Sector(s)

Not applicable.

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MSAPMSUP310A Contribute to the development of plant documentation

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit of competency covers the development of relevant plant documentation and systems in response to identified information requirements including the development and/or amendment of workplace documents, procedures and record keeping systems.

Application of the Unit

Application of this unit

This competency is typically performed by an experienced operator, leading hand or supervisor. The employee will:

- determine what needs to be done
- draft new/revised documentation
- arrange for documentation to be checked
- follow document control procedures.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

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This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify information need/deficiency.	1.1 Determine the information requirements of the organization. 1.2 Evaluate current documentation. 1.3 Recognise information need/deficiency. 1.4 Discuss information requirements with appropriate personnel.
2. Develop/revise plant documentation.	2.1 Specify information need and set/prioritise objectives 2.2 Analyse existing documentation/records in accordance with specified requirements. 2.3 Develop/amend documentation as a draft in accordance with specifications to standard format. 2.4 Issue documentation to appropriate personnel for review. 2.5 Edit documentation and amend in accordance with review requirements. 2.6 Complete documentation to satisfy the initial identified need/deficiency.
3. Communicate changes to plant documentation.	3.1 Explain and communicate documentation to all relevant personnel. 3.2 Distribute documentation to all appropriate personnel. 3.3 Evaluate implementation of documentation.

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	3.4 Amend documents if required.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge of organisation standard procedures, work instructions and relevant regulatory requirements along with the ability to implement them within appropriate time constraints relevant to the job.

Knowledge of organisation information systems, procedures, equipment and relevant documentation sufficient to be able to develop or amend company documentation.

Knowledge of the relevant OHS and environmental requirements is required along with an ability to implement them in a manner which is relevant to the drafting of all relevant documentation.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- identify and describe own role and role of other employees.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets, work instructions and material labels as provided to operators.

Writing is required to the level of drafting documents for the required audience.

Numeracy is also required to the extent required by production data, work instructions and procedures.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

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Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Consistent performance should be demonstrated. For example, look to see that:

- information required is researched, and intended use is taken into account
- documentation is completed accurately, concisely and in accordance with requirements
- completed documentation is easily understood by the recipient
- information is communicated in the appropriate manner
- communication distinguishes between relevant and peripheral issues.

Assessment method and context

Assessment will occur using work-based documents and in a work-like environment.

Competence in this unit may be assessed:

- by direct observation and accessing the workplace records system
- in a situation allowing the generation of evidence of the ability to recognise, anticipate and solve problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

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The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments in the industry.

Work is governed by established workplace procedures, and extent of authority for drafting/document approval.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Documentation

This unit of competency includes sources of documentation such as:

- maintenance logs
- non-compliance reports
- incidence and accident reports
- permits
- schematics/process flows/ engineering drawings.
- job cards
- standard operating procedures
- work instructions
- operating manuals
- quality procedures
- training program contents
- materials safety data sheets.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/s recorded in the procedures.

Typical problems may include:

- inaccurate source documents
- out-of-date source documents
- source documents too technical/lacking detail/of wrong focus
- prioritising of document drafting with other work.

Appropriate action for problems outside of area of responsibility may be reported to an appropriate person.

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Appropriate action for solving problems within area of responsibility includes asking questions and seeking assistance from appropriate persons/sources

Unit Sector(s)

Not applicable.

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MSAPMSUP330A Develop and adjust a production schedule

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit refers to the scheduling of production to meet operational requirements. It aims at ensuring that operators identify resource requirements, and document, monitor and adjust schedules in response to operational variations.

Application of the Unit

Application of this unit

This competency applies to operators who are required to optimise plant production and costs of production, using daily and weekly run plan guidelines/production schedules.

Typically, work would include authorising, planning, scheduling and prioritising of day to day activities.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify resources to meet production requirements.	1.1 Determine demand for product. 1.2 Access and verify information on orders, stocks and delivery. 1.3 Determine material requirements. 1.4 Determine human resource requirements. 1.5 Determine health, safety or environment issues in meeting requirements.
2. Develop schedules	2.1 Determine production priorities. 2.2 Identify production opportunities ('windows'). 2.3 Develop production schedules in accordance with procedures taking account of safety requirements. 2.4 Communicate and distribute production schedules to appropriate personnel.
3. Monitor production schedules.	3.1 Monitor production output against schedule. 3.2 Identify variations between production and schedule. 3.3 Record operational variation and discuss with appropriate personnel. 3.4 Identify possible cause of variation.

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4. Adjust schedules.	4.1 Adjust schedules in response to operational variation. 4.2 Adjust schedules in response to unexpected events. 4.3 Distribute adjusted/amended schedules to appropriate personnel. 4.4 Maintain product output in accordance with production and health, safety and environment requirements.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Competence includes the ability to apply and explain:

- production objectives, priorities, targets and resource requirements
- customer and quality requirements
- process and plant operational requirements
- hazards associated with the process
- awareness of the hierarchy of control in controlling the hazards
- impact of adjustments on process/plant efficiencies and production outcomes/targets
- safety implications for schedule/schedule changes
- planning, sequencing, monitoring and reviewing steps
- company policies and procedures

as is relevant to scheduling of production to meet operational requirements.

Language, **literacy and numeracy requirements**

This unit requires the ability to access and interpret a range of written, numeric and graphical data.

Writing is required to the level of interpreting orders (and forecasts) and producing schedules and related reports.

Numeracy is required to interpret numeric data and relevant statistics (such as trends and cycles) and from this calculate production and resource requirements.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

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A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

This unit may be best assessed using a range of scenarios/case studies and 'what ifs' as the stimulus with a walk-through of the scheduling process forming part of the response. These assessment activities should cover a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.

Critical aspects

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to

- identify resource requirements
- record, monitor and adjust schedules in response to operational requirements.

Consistent performance should be demonstrated. For example, look to see that:

- resource requirements are correctly identified in accordance with production requirements
- schedules are planned for the most effective and efficient manner to meet operational requirements
- schedules allow for safety, health and environmental (HSE) issues and reinforce HSE priorities
- timelines are adhered to
- schedules are adjusted and resource requirements amended in response to operational variations
- variations to schedules are communicated and documented appropriately.

Context of assessment

This unit of competency will be assessed:

- on a processing plant
- in as holistic a manner as is practical
- over a range of situations which will include disruptions to normal, smooth operation
- through questioning and the use of 'what if' scenarios both on the plant (during demonstration of normal operations and walk throughs of abnormal operations) and off the plant
- by using a combination of these techniques.

Assessment for this unit of competency may:

- be integrated with the assessment of other relevant units of competency
- require simulation to allow for timely assessment of parts of the unit, eg Elements 1 and 4. Simulation should be based on the actual plant and will include walk throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays.

Method of assessment

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In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency is typically performed by an experienced operator, team leader or similar.

Indicative functions include:

- regular planning operations
- communication with all relevant personnel, including management and administration.

Unit content areas include responses to:

- immediate production needs
- future production needs
- reworking requirements.

Indicative information sources and resources include:

- customer requirements
- organisational plans, policies and procedures
- production schedules, run plans
- resource utilisation actuals and targets.

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All operations are performed in accordance with standard operating procedures.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Health, **Safety and Environment** (**HSE**)

All operations are subject to stringent health, safety and environment requirements, which may be imposed through State or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the scheduler needs to ensure the HSE requirements take precedence.

Unit Sector(s)

Not applicable.

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MSAPMSUP382A Provide coaching/mentoring in the workplace

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the skills and knowledge required to act as a mentor/coach to other individuals in the workplace. Coaching and mentoring are undertaken within the coach/mentor's area of expertise on a one on one basis.

The mentoring/coaching process applies to any area of the business or professional endeavours such as acquisition of specific business competencies, progress with overall business development, individual and personal development.

Application of the Unit

Application of this unit

This competency is typically performed by senior operators or team leaders who have significant workplace experience. At all times they would be liaising with relevant personnel when undertaking the coaching/mentoring role.

The coach/mentor would:

- facilitate the exploration of needs, motivations and thought processes to assist the individual in identifying areas for development
- observe, listen and ask questions to identify the employee's situation
- use questioning techniques to identify solutions and actions rather than take a directive approach
- support the employee in setting appropriate goals and methods of assessing progress in relation to goals
- provide encouragement, support and constructive feedback
- apply tools and techniques which may include one on one training, facilitating, counselling and networking
- evaluate outcomes of process to ensure the employee is achieving goals.
-

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Individual enterprises may choose to add prerequisites and co-requisites relevant to their processes.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Establish coaching/ mentoring relationship.	1.1 Identify areas for development in line with organisational and individual's requirements. 1.2 Use effective communication styles to develop trust, confidence and rapport. 1.3 Make agreements on how the relationship will be conducted, including: • the amount of time involved for both parties • confidentiality of information • identification of development opportunities • development plan towards achieving goals. 1.4 Discuss and clarify expectations and goals.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	1.5 Seek input from other relevant personnel if required.
2. Provide coaching/ mentoring support.	2.1 Assist the individual to identify and evaluate opportunities to achieve agreed goals/development activities. 2.2 Share personal experiences and knowledge with the individual to assist in progress to agreed goals/development. 2.3 Provide a supportive environment to allow the individual to develop towards the achievement of goals. 2.4 Encourage the individual to make decisions and take responsibility for the courses of actions or solutions under consideration. 2.5 Provide assistance and guidance in a manner which allows the individual to retain responsibility for achievement in their goals.
3. Evaluate effectiveness of coaching/mentoring.	3.1 Recognise and openly discuss changes in the coaching/mentoring relationship. 3.2 Make adjustments to the relationship to take account of the needs of both the mentor/coach and the individual. 3.3 Seek feedback from individual and other relevant personnel to identify and implement improvements.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge of the principles of coaching and mentoring for development of competence.

Knowledge of organization standard procedures and work instructions and relevant regulatory requirements along with the ability to apply them to the coaching/mentoring process.

Competence also includes the ability to:

- work effectively with individuals who have diverse work styles, aspirations, cultures and perspectives
- use effective methods of coaching/mentoring

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- apply organisation policies, procedures and plans
- apply methods and techniques for eliciting and interpreting feedback
- explain relevant career paths and competency standards in the organisation
- apply methods for identifying development opportunities
- use effective planning skills to organise activities
- give, receive and analyse feedback effectively

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret organisation requirements which may be included in:

- quality assurances and/or procedures manuals
- goals, objectives, plants, systems and processes
- legal and organisational policy/guidelines and requirements
- OHS policies, procedures and programs
- confidentiality and security requirements
- business and performance plans
- anti-discrimination and related policy
- access and equity principles and practice
- ethical standards
- quality and continuous improvement processes and standards.

Writing is required to the level of completing records and reports.

Numeracy is required to the extent required by work instructions and procedures.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that an understanding of mentoring/coaching and its role and benefits is understood. Competence must be demonstrated in communication skills in relation to listening, questioning, providing constructive feedback and non-verbal communication.

Consistent performance should be demonstrated, in particular:

- an understanding in the role and benefits of mentoring/coaching in the business

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- use of significant workplace knowledge and experience to assist another individual to achieve their goals/development needs
- application of effective communication styles
- effectively creating a learning environment that allows for open discussion, feedback, tolerance of mistakes during learning, within a safe environment, and affirmation of the individual's worthiness.

Assessment method and context

Assessment will occur on-the-job or in a simulated workplace.

Competence in this unit may be assessed:

- by observation or questioning to indicate understanding
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

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This competency applies to all work environments in the process manufacturing industries.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- relevant process equipment, components and auxiliary equipment
- PPE.

Hazards

Typical workplace hazards include:

- chemicals and hazardous materials
- gases and liquids under pressure
- moving machinery
- materials handling
- working at heights, in confined spaces, or in environments subjected to heat, noise, dusts or vapours.

Problems

Anticipate and solve problems means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical problems may include:

- lack of materials and resources
- conflicting work priorities
- time constraints.
- lack of cooperation
- lack of willingness to receive feedback

Appropriate action for non-routine problems may include reporting to designated

person or other action specified in the procedures.

Unit Sector(s)

Not applicable.

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MSAPMSUP383A Facilitate a team

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the identification of team's goals and timelines, negotiating with the team to allocate tasks and ensuring the goals and timelines are met.

Application of the Unit

Application of this unit

This competency is typically performed by team leaders/operators who work within a team structure and are responsible for coordinating team functions within designated goals. It also requires the use of a range of well developed skills requiring some discretion and judgement to recognise and resolve a range of problems/conflict.

The team leader will:

- collect, analyse and organise information
- communicate ideas and information
- plan and organise activities
- work within a team
- use mathematical ideas and techniques
- solve problems
- use technology.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify tasks to achieve team goals.	1.1 Identify and agree on team goals, with team members input. 1.2 Identify tasks required to achieve team goals. 1.3 Identify team and individual safety responsibilities. 1.4 Allocate responsibilities of individuals within the team. 1.5 Ensure designated team goals are met by identifying strategies and timelines required to complete each task.
2. Organise allocation of tasks.	2.1 Estimate time and resources needed to complete tasks. 2.2 Identify competencies of individual team member and allocate/negotiate individual responsibilities. 2.3 Agree timelines for completion of each task. 2.4 Identify resources and support necessary for completion of job.
3. Monitor completion of allocated tasks.	3.1 Measure team performance against its goals. 3.2 Monitor individual compliance with procedures and take action as required.

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	3.3 Check at regular intervals that agreed timelines for completion of tasks are being met. 3.4 Negotiate alternative strategies to achieve allocated tasks when designated timelines are not being met. 3.5 Provide support to colleagues to ensure completion of allocated tasks.
4. Resolve conflicts between team members.	4.1 Identify conflict situations between team members. 4.2 Identify causes of conflict. 4.3 Implement conflict resolution procedures relevant to the level of conflict and to established practices. 4.4 Seek assistance as required to ensure conflict resolution.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge and understanding of the system sufficient to indicate understanding and knowledge of negotiating with team members to allocate and complete tasks to achieve team goals.

Knowledge of organization procedures, quality requirements and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risk using the hierarchy of controls applied to the manufacture of products. Application of approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up.

Knowledge as a basis for solving problems, including:

- effective use of teamwork
- impact of individual team member strengths/weaknesses/competencies on the allocation of responsibilities
- OHS roles and responsibilities of the individual and the team
- effective use of workplace documentation
- teamwork strategies
- working to timelines

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- allocation of tasks
- health, safety and environment obligations of employers and employees imposed by the relevant legislation.

Competence includes the ability to:

- plan own work, including predicting consequences and identifying improvement
- identify and describe own role and role of others involved in the team
- identify team and individual goals relevant to the practical operation of the system
- identify team, section and organisation goals relevant to the practical operation of the system.

Language, literacy and numeracy requirements

This unit requires the ability to read and understand typical procedures and work instructions, plant drawings and safety information as provided to operators.

Writing is required to the level of completing workplace forms, quality assurance records and production reports.

Basic numeracy is required to the extent required by work instructions and procedures.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- identify and prioritise work activities
- negotiate and monitor work activities
- understand the impact of individual tasks on the completion of team objectives
- allocate and oversee that tasks are completed safely and within timelines
- ensure relevant procedures are followed and used when completing activities
- identify and take appropriate action on problems or potential problems.

Consistent performance should be demonstrated. For example, look to see that:

- willingness to participate as part of a group is demonstrated
- support is sought from and given to colleagues to achieve team objectives

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- all safety procedures are always followed.

Assessment method and context

Assessment will occur in work-like environment.

Competence in this unit may be assessed:

- in a situation allowing the generation of evidence of the ability to recognise, anticipate and solve problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments and sectors in the industries.

Procedures

All operations are performed in accordance with procedures.

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Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Problems

Anticipate and solve problems means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution / a solution recorded in the procedures.

Typical problems may include:

- required information/materials not available
- required tool/equipment not available
- conflicting priorities
- short timeframe.

Variables

This competency unit may vary according to organization use of the following information sources and documentation:

- procedures/work instructions
- materials safety data sheets
- job cards
- maintenance logs
- plant drawings.

Key variables to be monitored include:

- type of communication used within each organisation
- established work practices/policies
- size and structure of the team/organisation
- group goals - individual, team and organisation
- organisation specific conflict resolution procedures.
-

Unit Sector(s)

Not applicable.

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MSAPMSUP390A Use structured problem solving tools

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the solving of process and other problems, beyond those associated directly with the process unit/equipment, using structured process improvement tools to identify improvements and/or solve problems.

Application of the Unit

Application of this unit

The competency is typically performed by an experienced operator, team leader or supervisor.

Generally the person would be part of a team during the solving of complex or systemic problems and would be expected to perform all parts of this unit and at all times would be liaising and cooperating with other members of the team. This includes:

- using a range of formal problem solving techniques
- identifying and clarifying the nature of the problem
- devising the best solution
- evaluating the solution
- developing an implementation plan to rectify the problem.

This unit does not cover the solving of problems undertaken as part of the operator's normal role which is covered in the relevant operation competency unit.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify the problem.	1.1 Identify variances from normal operating parameters and product quality. 1.2 Define the extent, cause and nature of the problem by observation and investigation. 1.3 State and specify the problem clearly.
2. Determine fundamental cause of problem.	2.1 Identify possible causes based on experience and the use of problem solving tools/analytical techniques. 2.2 Develop possible cause statements. 2.3 Identify fundamental cause.
3. Determine corrective action.	3.1 Consider all possible options for resolution of the problem. 3.2 Consider strengths and weaknesses of possible options. 3.3 Determine corrective action to remove the problem and possible future causes. 3.4 Develop implementation plans identifying measurable objectives, resource needs and timelines in accordance with safety and operating procedures. 3.5 Develop recommendations for ongoing monitoring

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	and testing.
4. Communicate recommendations.	4.1 Prepare report on recommendations. 4.2 Present recommendations to appropriate personnel. 4.3 Follow up recommendations if required.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognise non-standard situations.

This unit of competency includes use of analytical techniques in problem solving such as:

- brainstorming
- fishbone diagrams/cause and effect diagrams
- process logic/process requirements
- logic tree
- similarity/difference analysis
- Pareto analysis
- force field/SWOT analysis
- flow charts
- control charts, runcharts and graphs
- scattergrams.

Action plans to solve problems are prepared including:

- priority requirements
- measurable objectives
- resource requirements
- methods for reaching objectives
- timelines
- coordination and feedback requirements
- safety requirements
- risk assessment
- environmental requirements.

Language, **literacy and numeracy requirements**

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This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of report writing and completing workplace forms.

Basic numeracy is also required, eg to interpret quality data and graphs.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to apply and explain:

- relevant equipment and operational processes
- enterprise policies and procedures
- enterprise goals, targets and measures
- enterprise quality, OHS and environmental requirements
- principles of decision-making strategies and techniques
- enterprise information systems and data collation
- industry codes and standards.

Consistent performance should be demonstrated. For example, look to see that:

- problems are recognised and clarified
- possible causes are identified, based on experience and use of analytical techniques in solving the problem, including:
  - identifying variations
  - identifying cause and effect
  - separating single problems from multiple problems
  - recognising recurring problems.
- fundamental cause of process or equipment faults is determined
- corrective/preventative implementation plans are developed to avoid recurrence of the problem
- implementation plan is presented to relevant personnel.

Assessment method and context

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Assessment will occur on the job or in a simulated workplace.

Competence in this unit may be assessed:

- in a situation allowing the generation of evidence of the ability to recognise and respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

The competency unit applies to a wide range of processes and equipment. The process manufacturing technical units of competency include a problem solving element where problems specific to that competency unit are to be resolved. This competency unit is where structured problem solving techniques are to be applied more broadly, or with greater depth/rigour than is implied by the problem solving element of the technical units.

In large plants or manufacturing organisations with multiple processes, it may apply to more than one process if those processes interact with each other. It applies to all operators across all functions.

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Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Hazards

Typical hazards include leaks, spillages and equipment hazards that can occur during the walk-through of a plant.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

- non- routine process and quality problems
- equipment selection, availability and failure
- teamwork and work allocation problems
- safety and emergency situations and incidents.
-

Unit Sector(s)

Not applicable.

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MSAPMSUP400A Develop and monitor quality systems

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the establishment, maintenance and evaluation of quality systems for a complete production area and/or plant.

Application of the Unit

Application of this unit

This competency is typically performed by an experienced technician, leading hand or supervisor. It includes:

- developing and implementing quality systems
- identifying and maintaining documentation for the quality systems
- implementing training programs
- evaluating the quality system and making improvements where necessary.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Establish and maintain framework for successful quality system.	1.1 Develop relevant policies which demonstrate the commitment of the enterprise to quality and a culture of improvement. 1.2 Define and allocate responsibilities in quality system. 1.3 Consult with key personnel to define role of procedures in the quality system. 1.4 Seek and provide financial and human resources to allow thorough implementation of quality system. 1.5 Develop system for communicating quality message and culture in the organisation.
2. Establish and maintain quality documentation system.	2.1 Identify quality documentation required, including records of improvement plans and initiatives. 2.2 Prepare and maintain quality documentation and keep data records. 2.3 Maintain document control system.
3. Implement structured training program in accordance with quality system requirements.	3.1 Analyse roles and duties of relevant personnel. 3.2 Identify training needs in relation to quality. 3.3 Identify training programs to meet these needs. 3.4 Implement the training program. 3.5 Develop and maintain training records.
4. Evaluate the quality system.	4.1 Undertake regular audits of the quality system, its policies and procedures. 4.2 Develop new procedures/work instructions as required.

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	4.3 Implement improvements in the quality system.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of organisation quality systems and appropriate national and international quality standards and protocols.

Knowledge of the relevant OHS and environmental requirements and detailed knowledge of enterprise standard operating procedures is required.

An appreciation of business goals and key performance indicators is required as a basis for decision making and action.

Competence to include the ability to apply and explain the principles of:

- process improvement
- policy and procedure development
- data management and documentation.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret quality procedures and work instructions, quality manuals, equipment manuals as is applicable to developing quality systems and procedures.

Writing is required to the level of developing quality documentation.

Numeracy is also required, eg to analyse quality data or charts.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

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Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- effectively maintain and evaluate quality systems carried out
- implement relevant staff training programs
- produce adequate quality documentation including policies and procedures.

Consistent performance should be demonstrated. For example, look to see that:

- the development, implementation and evaluation of the quality system runs smoothly
- all safety procedures are always followed.

Assessment method and context

Assessment will occur in a work-like environment.

Competence in this unit may be assessed:

- in a situation allowing the generation of evidence of the ability to recognise, anticipate and solve problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

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The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to a wide range of processes and equipment in all work environments and sectors in the process manufacturing industries.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of workplace documentation such as:

- organisational policies
- quality manuals
- standard operating procedures and work instructions
- company business objectives
- key performance indicators).

Quality audits and evaluations may be undertaken as an individual or as part of a team.

Hazards

Typical hazards include leaks, spillages and equipment hazards that can occur during the walk-through of an operating plant or factory.

Problems

Typical problems may include:

- lost documentation
- maintaining updated documents
- staff not following procedures
- poor communication.
-

Unit Sector(s)

Not applicable.

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MSAPMWJ201A Use high pressure water jetting equipment

Modification History

Release 2: ISC upgrade to incorporate changes to Australian Standard.

Unit Descriptor

This unit of competency covers the use of high pressure water jetting equipment under the supervision of a competent operator. The job may be to clean, prepare, abrade, cut or demolish concrete, steel or other plant, equipment, vessels or infrastructure. This work is undertaken in compliance with *AS/NZS 4233.1*: *2013 High Pressure Water Jetting Systems Part 1. Safe Operation and Maintenance*, or its authorised replacement and *Safe Work Australia Guide for Managing Risks from High Pressure Water Jetting December 2013*, its state equivalent (where one exists) or the authorised replacement.

Application of the Unit

In a typical scenario, two or more operators (at least one of whom will be a competent operator) working as a team will operate a high pressure water jetting system. AS/NZS 4233.1:2013 defines this work as work with:

(*a*) *High pressure water jetting systems pressurised by positive displacement pumps with an output capability greater than 800 bar litres per minute*.

(*b*) *High pressure water jetting operations carried out at pressures above 800 bar litres per minute and includes jetting operations involving the use of additives and abrasives*.

(*c*) *Water jetting operations below 800 bar litres per minute where there is a foreseeable risk of injury to operators*.

It further defines:

High pressure water jetting systems with an output capability greater than 800 bar litres per minute and less than 5600 bar litres per minute are identified as Class A and systems with an output capability in excess of 5600 bar litres per minute are identified as Class B.

The competent operator is defined by *MSAPMWJ301A Operate a high pressure water jetting system*.

Competence may also be required in a range of other units of competency in order to be allowed to operate on site under supervision. Work will be undertaken on a worksite which may be a client's site or a site belonging to the organisation.

AS/NZS 4233.1:2013 states that ' Verification of competency or refresher training on high pressure water jetting operations shall be carried out and documented at appropriate intervals not exceeding two years to ensure the continued competency of operators'.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Prepare for work	1.1	Obtain required job details as part of a team
		1.2	Complete site access and work control requirements
		1.3	Identify site hazards and required hazard controls
		1.4	Prepare required equipment under supervision
		1.5	Participate in toolbox meeting or similar, as required
		1.6	Complete required pre-work paperwork
2	Complete on-site preparation	2.1	Arrive at site ready for job
		2.2	Liaise with job owner, as appropriate
		2.3	Obtain required permits/work authorities, as directed
		2.4	Follow job pack as directed

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		2.5	Check available water
		2.6	Check waste disposal
		2.7	Recognise and control job and site-specific hazards
3	Set up job under supervision	3.1	Prepare worksite
		3.2	Set up water jetting equipment
		3.3	Liaise with other work groups, as appropriate
		3.4	Establish appropriate means of communication between operators
		3.5	Ensure hazard controls are operational and adequate
		3.6	Check and use required personal protective equipment
		3.7	Test emergency shut-off
4	Undertake water jetting job in accordance with procedures	4.1	Start up high pressure water jetting system
		4.2	Communicate as appropriate
		4.3	Operate equipment to proceed with job, as specified
		4.4	Monitor job conditions
		4.5	Monitor job and equipment, as directed
		4.6	Maintain required line of sight
		4.7	Monitor hazards and activate emergency stop, as required
		4.8	Recognise faults and take appropriate action
		4.9	Complete required paperwork
5	Complete job	5.1	Shut down equipment
		5.2	Clean job site and equipment
		5.3	Service and inspect equipment under supervision, as required
		5.4	Store equipment, as required
		5.5	Restock running spares and consumables, as directed

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5.6 Report any issues or incidents, as required

5.7 Participate in debrief

5.8 Complete required paperwork

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- recognising conditions which will lead to out of specification product or unsafe situation
- implementing the enterprise's procedures in a manner relevant to the correct use of the equipment
- conveying information relevant to the operation of equipment clearly and effectively
- maintaining appropriate levels of environmental controls and quality assurance
- reading and interpreting safety data sheets(SDS)
- recognising equipment problems and taking action to prevent equipment failure
- reading and numeracy to interpret workplace documents, instrumentation and technical information

Required knowledge

Required knowledge includes:

- hazards associated with the process, plant and equipment where water jetting is to be carried out
- high pressure water jetting hazards
- injuries resulting from high pressure water jets and appropriate responses
- application of the hierarchy of control in controlling the hazards
- relevant safety signs and symbols
- fundamentals of hydraulics
- basic understanding of reaction force and its determination
- relevant communication systems including hand signals
- basic principles of heat stress, fatigue, hydration, physiology, biomechanics as applied to water jetting
- basic principles of how high pressure water jetting nozzles/jets work
- basic understanding of diesel engine systems

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- basic principles (only) of pressure and flow relationships

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that use of equipment is understood and that the importance of critical properties, settings and readings is known. Competence must be demonstrated in the operation of equipment to the level required for this unit of competency. Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective actions. Holistic assessment of this unit of competency with other related units is preferred. Consistent performance should be demonstrated. In particular look to see that: • hazards are identified and controlled • job is completed efficiently and to required standards • quality is monitored • required measurements/observations are continually made • all health, safety and environment (HSE) requirements are followed • problems are anticipated and appropriate action is taken (i.e. problem fixed or reported). • The assessor should be able to demonstrate competence in water jetting operations and have adequate industry experience (with three to five years being a guideline) in water jetting.
Context of and specific resources for assessment	Assessment will require access to operating equipment over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. Assessment will occur over a range of situations which will include disruptions to normal, smooth operations. Simulation or case studies/scenarios may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual plant and will include 'walk-throughs' of the relevant competency components. A bank of scenarios/case studies/what ifs and questions will be required to probe the reasoning behind observable actions.

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Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Procedures	All operations are performed in accordance with standard procedures. Procedures may be written, verbal, computer-based or in some other form, and may include: • all work instructions • standard operating procedures (SOPs) • Australian standards • Guidance Notes • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. Responsible Care) and government regulations
Site access requirements	Site access requirements may include: • site induction • other site/client requirements
Work control requirements	Work control requirements may include: • client/site requirements, such as permits or other authorities to enter site, commence and continue work
Prepare equipment	Preparation of required equipment may include: • selecting (e.g. from store) equipment needed for the job, under direction • checking equipment is in appropriate condition for the job, under supervision

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	• checking equipment is within inspection date • loading equipment onto truck or similar, as directed • filling fuel and ensuring adequate supply of other consumables, as directed
Equipment	Equipment may include: • pump • pump motor/driver • hoses • guns, lances and nozzles • personal protective equipment • other equipment, plant, tools and hazard control devices required for the job
Job owner	Job owner may include: • client or their representative • site manager or their representative • production manager or their representative • maintenance manager or their representative • other person with prime responsibility for the plant/plant area which is the subject of the water jetting
Job paperwork	Job paperwork may be electronic, hard copy or other format and may include: • tool storeroom records • equipment loaded records • maintenance/inspection records/checklists • tag out/reports for failed equipment • hazard controls • work packs

Personal protective equipment	Personal protective equipment may include:
	• personal protective equipment as specified in:
	  • Section 4 AS/NZS 4233.1: 2013 High Pressure *Water Jetting Systems Part 1. Safe Operation and Maintenance, or its authorised replacement*
	  • *Section 5 Safe Work Australia Guide for Managing Risks from High Pressure Water Jetting December 2013,* or its authorized replacement
	• medical alert card as specified in Section 9.5 of *AS/NZS 4233.1: 2013 High Pressure Water Jetting Systems Part 1. Safe Operation and Maintenance, or its authorised replacement*
	• other equipment as required

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Liaise with job owner	Liaise with job owner may include: • confirming job owner needs and standards • confirming job and job site • checking job owner is satisfied with completed job • confirming compliance with site requirements • other job owner communications
Job pack	Job pack may include: • permits/clearances • safe work method statements • job safety and environment analysis (JSEA) or other hazard analysis and control information • Safety Data Sheets (SDS)
Water	Water is to be checked for appropriate: • amount (volume and pressure) • quality/properties • availability
Waste disposal	Waste disposal checks ensure that waste generated will be disposed of in an environmentally appropriate manner and in accordance with site requirements. Waste may include: • contaminated water • material removed by water jetting • fuel or similar waste • other wastes
Worksite preparation	Worksite preparation may include: • establishing exclusion zone (e.g. with barricades or tape) • fixing signage • ensuring safe footing for personnel • participating in/verifying isolations
Prepare water jetting equipment	Preparing water jetting equipment may include: • interpreting equipment markings • assembling equipment • checking electrical earth • flushing equipment • visual inspection of hoses
Communication	Communication may include: • hand signals • radio head phones • other appropriate means

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Hazards	Hazards may include: • high pressure hazards • site/process hazards • hazards arising from materials in job site, including materials being removed by water jetting • hose set-up and hose runs
Hazard controls	Hazard controls may include: • appropriate controls for all hazards identified • controls identified in the relevant permits to work • controls required by *AS/NZS 4233.1: 2013 High Pressure Water Jetting Systems Part 1. Safe Operation and Maintenance, or its authorised replacement* • other appropriate controls
Job conditions	Job conditions may include: • total work hours (for day/from base) • rest/rotation periods • weather • heat stress symptoms • site conditions
Monitor job and equipment	Monitoring job and equipment includes monitoring as directed: • the pump • system efficiency • product quality • mechanical equipment
Appropriate action	Appropriate action includes: • recognising actual and potential problems • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person
Solutions	Solutions may include: • activating emergency switch • stopping work until situation resolved • raising alarm • responding to injury

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Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent HSE requirements, which may be imposed through federal or state/territory legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence

Unit Sector(s)

Surface finishing

Competency field

Not applicable

Co-requisite units

Not applicable

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MSAPMWJ301A Operate a high pressure water jetting system

Modification History

Release 2: ISC upgrade to incorporate changes to Australian Standard.

Unit Descriptor

This unit of competency covers the operation of a high pressure water jetting system which may be used to clean, prepare, abrade, cut or demolish concrete, steel or other plant, equipment, vessels or infrastructure. This work is undertaken in compliance with *AS/NZS 4233.1*: *2013 High Pressure Water Jetting Systems Part 1. Safe Operation and Maintenance*, or its authorised replacement and *Safe Work Australia Guide for Managing Risks from High Pressure Water Jetting December 2013*, its state equivalent (where one exists) or the authorised replacement.

Application of the Unit

In a typical scenario, one or more operators (the number of operators is to be in accordance with the standard) will operate a high pressure water jetting system. AS/NZS 4233.1:2013 defines this work as work with:

(*a*) *High pressure water jetting systems pressurised by positive displacement pumps with an output capability greater than 800 bar litres per minute*.

(*b*) *High pressure water jetting operations carried out at pressures above 800 bar litres per minute and includes jetting operations involving the use of additives and abrasives*.

(*c*) *Water jetting operations below 800 bar litres per minute where there is a foreseeable risk of injury to operators*.

It further defines:

High pressure water jetting systems with an output capability greater than 800 bar litres per minute and less than 5600 bar litres per minute are identified as Class A and systems with an output capability in excess of 5600 bar litres per minute are identified as Class B.

The competent operator as defined by this unit of competency will be able to operate independently. Operators who are not competent to operate independently should be competent to operate under supervision (refer to *MSAPMWJ201A Use high pressure water jetting equipment*).

Operators will also need to be competent in a range of other units of competency in order to be allowed to operate independently on site. Work will be undertaken on a worksite which may be a client's site or a site belonging to the organisation.

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AS/NZS 4233.1:2013 states that ' Verification of competency or refresher training on high pressure water jetting operations shall be carried out and documented at appropriate intervals not exceeding two years to ensure the continued competency of operators'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Prepare for work	1.1	Obtain required job details
		1.2	Complete site access and work control requirements
		1.3	Identify site hazards and required hazard controls
		1.4	Prepare equipment required for the job
		1.5	Complete personnel requirements
		1.6	Complete required pre-work paperwork
2	Complete on-site preparation	2.1	Arrive at site ready for job
		2.2	Liaise with job owner as part of preparation
		2.3	Obtain required permits/work authorities

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		2.4	Interpret and follow job pack
		2.5	Check available water
		2.6	Check waste disposal
		2.7	Recognise and control job and site-specific hazards
		2.8	Communicate needs back to base
3	Set up job	3.1	Prepare worksite
		3.2	Set up water jetting equipment
		3.3	Liaise with other work groups, as appropriate
		3.4	Establish appropriate means of communication between operators
		3.5	Ensure hazard controls are operational and adequate
		3.6	Liaise with job owner, as required
		3.7	Select key variables
		3.8	Check and use required personal protective equipment
		3.9	Test emergency shut-off
4	Undertake water jetting job in accordance with procedures	4.1	Start up high pressure water jetting system
		4.2	Communicate as appropriate
		4.3	Operate equipment to proceed with job, as specified
		4.4	Monitor job conditions
		4.5	Monitor job and equipment and take appropriate action
		4.6	Maintain required line of sight
		4.7	Monitor hazards and activate emergency stop, as required
		4.8	Diagnose faults and take appropriate action
		4.9	Complete required paperwork
5	Complete job	5.1	Shut down equipment

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5.2 Liaise with job owner

5.3 Clean job site and equipment

5.4 Service and inspect equipment

5.5 Store equipment

5.6 Restock running spares and consumables

5.7 Report any issues or incidents, as required

5.8 Debrief relevant stakeholders

5.9 Complete required paperwork

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- recognising conditions which will lead to out of specification product or unsafe situation
- implementing the enterprise's procedures in a timely manner
- using equipment in accordance with procedures and manufacture instructions
- conveying information relevant to the operation clearly and effectively
- maintaining appropriate levels of environmental controls and quality assurance
- determining and applying pressure drop and reaction force
- interpreting and applying pressure drop charts and nozzle charts
- reading and interpreting safety data sheets (SDS)
- recognising equipment problems and taking action to prevent equipment failure
- reading and numeracy to interpret workplace documents, instrumentation and technical information

Required knowledge

Required knowledge includes:

- hazards associated with the process, plant, equipment where water jetting is to be carried out
- high pressure water jetting hazards
- injuries resulting from high pressure water jets and appropriate responses

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- application of the hierarchy of control in controlling the hazards
- relevant safety signs and symbols
- principles of hydraulics
- relevant communication systems including hand signals
- heat stress, fatigue, hydration, physiology and biomechanics, as applied to water jetting
- principles and application of nozzle design
- how high pressure water jets work
- diesel engine systems
- quantitative pressure and flow relationships

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that use of equipment is understood and that the importance of critical properties, settings and readings is known. Competence must be demonstrated in the operation of equipment to the level required for this unit of competency. Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective actions. Holistic assessment of this unit of competency with other related units is preferred. This unit includes all aspects of MSAWJ201A Use high pressure water jetting equipment. Assessment of this unit should automatically include evidence of competency for MSAWJ201A. Consistent performance should be demonstrated. In particular look to see that: • hazards are identified and controlled • job is completed efficiently and to required standards • quality is monitored • required measurements/observations are continually made • all health, safety and environment (HSE) requirements are followed • problems are anticipated and appropriate action is taken (i.e. problem fixed or reported). • The assessor should be able to demonstrate competence in water jetting operations and have adequate industry

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	experience (with three to five years being a guideline) in water jetting.
Context of and specific resources for assessment	Assessment will require access to operating equipment over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. Assessment will occur over a range of situations which will include disruptions to normal, smooth operations. Simulation or case studies/scenarios may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual plant and will include 'walk-throughs' of the relevant competency components. A bank of scenarios/case studies/what ifs and questions will be required to probe the reasoning behind observable actions.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Procedures	All operations are performed in accordance with standard procedures. Procedures may be written, verbal, computer-based or in some other form, and may include: • all work instructions • standard operating procedures (SOPs) • Australian standards • Guidance Notes • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. Responsible Care) and government

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	regulations
Site access requirements	Site access requirements may include: • site induction • other site/client requirements
Work control requirements	Work control requirements may include: • client/site requirements, such as permits or other authorities to enter site, commence and continue work
Prepare required equipment	Preparation of required equipment may include: • determining equipment required for the job • selecting (e.g. from store) equipment needed for the job • checking equipment is in appropriate condition for the job • checking equipment is within inspection date • loading equipment onto truck or similar, if required • filling fuel and ensuring adequate supply of other consumables
Equipment	Equipment may include: • pump • pump motor/driver • hoses • guns, lances and nozzles • personal protective equipment • other equipment, plant, tools and hazard control devices required by the job
Personnel requirements	Personnel requirements may include: • briefing other team members • participating in/leading toolbox meeting • checking team members are fit for work • other requirements
Job owner	Job owner may include: • client or their representative • site manager or their representative • production manager or their representative • maintenance manager or their representative • other person with prime responsibility for the plant/plant area which is the subject of the water jetting
Job paperwork	Job paperwork may be electronic, hard copy or other format and may include: • tool storeroom records

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	• equipment loaded records • maintenance/inspection records/checklists • tag out/reports for failed equipment • hazard controls • work packs
Personal protective equipment	Personal protective equipment may include: • personal protective equipment as specified in: • Section 4 *AS/NZS 4233.1: 2013 High Pressure Water Jetting Systems Part 1. Safe Operation and Maintenance,* or its authorised replacement Section 5 *Safe Work Australia Guide for Managing Risks from High Pressure Water Jetting December 2013,* or its authorized replacement • medical alert card as specified in Section 9.5 of *AS/NZS 4233.1: 2013 High Pressure Water Jetting Systems Part 1. Safe Operation and Maintenance,* or its authorised replacement • other equipment as required
Liaise with job owner	Liaise with job owner may include: • confirming job owner needs and standards • confirming job and job site • checking job owner is satisfied with completed job • confirming compliance with site requirements • other job owner communications
Job pack	Job pack may include: • permits/clearances • safe work method statements • job safety and environment analysis (JSEA) or other hazard analysis and control information • Safety Data Sheets (SDS)
Water	Water is to be checked for appropriate: • amount (volume and pressure) • quality/properties • availability
Waste disposal	Waste disposal checks ensure that waste generated will be disposed of in an environmentally appropriate manner and in accordance with site requirements. Waste may include: • contaminated water • material removed by water jetting

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	• waste fuels • other wastes and emissions
Worksite preparation	Worksite preparation may include: • establishing exclusion zone (e.g. with barricades or tape) • fixing signage • ensuring safe footing for personnel • participating in/verifying isolations
Prepare water jetting equipment	Preparing water jetting equipment may include: • interpreting equipment markings • assembling equipment • checking electrical earth • compliance with relevant Australian standards • flushing equipment • visual inspection of hoses
Communication	Communication may include: • hand signals • radio head phones • other appropriate means
Key variables	Key variables may include: • pressure • flow rate • rpm of pump motor/driver • power of pump motor/driver • nozzle type and size • hose assemblies • control system variables
Hazards	Hazards may include: • high pressure hazards • site/process hazards • hazards arising from materials in job site, including materials being removed by water jetting • hose set-up and hose runs
Hazard controls	Hazard controls may include: • appropriate controls for all hazards identified • controls identified in the relevant permits to work • controls required by *AS/NZS 4233.1: 2013 High Pressure Water Jetting Systems Part 1. Safe Operation and Maintenance, or its authorised replacement*

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	• other appropriate controls
Job conditions	Job conditions may include: • total work hours (for day/from base) • rest/rotation periods • weather • heat stress symptoms • site conditions
Monitor job and equipment	Monitoring job and equipment includes monitoring: • the pump and its motor (means of providing motive power) • productivity • system efficiency • product quality • mechanical equipment • high pressure jet formation • waste management • hose condition
Appropriate action	Appropriate action includes: • recognising actual and potential problems • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person
Solutions	Solutions may include: • activating emergency stop • stopping work until situation is resolved • raising alarm • responding to injury
Health, safety and environment (HSE)	All operations to which this unit applies are subject to stringent HSE requirements, which may be imposed through federal or state/territory legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence

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Unit Sector(s)

Surface finishing

Competency field

Not applicable

Co-requisite units

Not applicable

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MSARVG201A Tow a recreational vehicle safely

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the skills and knowledge required to safely tow a recreational vehicle within a caravan park or confined workplace space and on the open road.

Application of the Unit

Application of the unit	This unit of competency applies to those involved in the manufacture, service and repair, or sale of recreational vehicles. It may be applied in different workplaces, sectors and circumstances. This unit assumes possession by the driver of a current driving licence. Driving must be carried out in compliance with the licence requirements and regulations of the relevant state/territory roads and traffic authority. Type of vehicle driven must comply with that permitted by driver's licence.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Assess safe towing weight of recreational vehicle	1.1. Calculate the gross weight of recreational vehicle and determine aggregate mass 1.2. Check towing capacity of towing vehicle 1.3. Check and adhere to tow bar capacity of towing vehicle 1.4. Confirm the weight ratio of recreational and towing vehicle as safe in accordance with state/territory requirements and regulations
2. Prepare for towing of recreational vehicle	2.1. Prepare recreational vehicle for towing 2.2. Conduct pre-operational checks on towing vehicle and recreational vehicle 2.3. Carry out any minor routine repairs 2.4. Report any complex faults and repairs to appropriate person and coordinate repairs 2.5. Identify and act on relevant statutory regulations to reduce possible injury to self and others 2.6. Attach recreational vehicle to towing vehicle in accordance with manufacturer and state/territory specifications, requirements and regulations 2.7. Check visibility and adjust position of mirrors, if

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ELEMENT	PERFORMANCE CRITERIA
	necessary
3. Safely tow recreational vehicle on an open road	3.1. Identify and comply with national and state/territory road rules and laws 3.2. Show courtesy and consideration to other road users 3.3. Manoeuvre recreational vehicle in forward and reverse directions and park in accordance with requirements, manufacturer instructions and traffic regulations 3.4. Identify any driving hazards and avoid or control them, using appropriate defensive driving techniques 3.5. Follow appropriate procedures in the event of a driving emergency 3.6. Constantly monitor and act upon traffic and road conditions to enable safe operation and ensure no injury to people or damage to property, equipment, loads and facilities 3.7. Reverse recreational vehicle to parking position, maintaining visibility and achieving accurate positioning
4. Safely tow vehicle in the workplace	4.1. Attach recreational vehicle to towing vehicle correctly and safely 4.2. Check visibility and adjust position of mirrors, if necessary 4.3. Identify any obstacles or hazards in planned route and remove or avoid, as appropriate 4.4. Safely tow recreational vehicle to required space and reverse in carefully 4.5. Position recreational vehicle as required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • using tools and equipment correctly and safely in simple, routine maintenance and servicing of recreational vehicle in preparation for towing

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REQUIRED SKILLS AND KNOWLEDGE
• monitoring and anticipating traffic and other hazards and taking appropriate action • using safe driving techniques relative to conditions • calculating weights and towing capacity of vehicles
Required knowledge
Required knowledge includes: • state/territory road codes and laws • weight-to-vehicle towing ratios set by state/territory authorities and manufacturers • general duty of care • occupational health and safety (OHS) regulations relevant to minor servicing and towing recreational vehicles • procedures to be followed in the event of a driving emergency

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Critical aspects of assessment	Evidence of the following is critical: • identifying and following enterprise procedures, and state/territory and federal legislative requirements, regarding driving on public roads and towing of recreational vehicles • safely manoeuvring and towing recreational vehicle according to OHS requirements • driving on an open road and in the workplacein a safe and courteous manner • complying with relevant state/territory roads and traffic authority driving regulations and license requirements pertaining to the class of vehicle • following OHS policies and procedures relevant to driving and towing a recreational vehicle • identifying driving hazards and using appropriate defensive driving techniques.
Context of assessment and resource implications	Assessment must ensure: • project or work activities that allow the candidate to demonstrate towing a recreational vehicle over a

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EVIDENCE GUIDE	
	period of time and in a suitable range of contexts • project or work activities that allow the candidate to address a range of typical minor routine repair or service needs in preparation for towing a recreational vehicle.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Road transport situations	Road transport situations may include: • operations conducted at day or night • typical weather conditions • on the open road • on a private road • while at a depot, base or warehouse • while at a client's workplace or worksite
Recreational vehicle	Recreational vehicles may include: • caravan • pop-top caravan • camper trailer • tent trailer • 5th wheeler • slide-on camper
Towing vehicle	Towing vehicles may include: • 2 wheel drive • 4 wheel drive • truck

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RANGE STATEMENT	
	• van • specialised towing truck/unit • tractor

Prepare recreational vehicle for towing	Preparing recreational vehicles for towing may include:
	• safely positioning and securing:
	  • fittings
	  • furnishings materials
	  • components
	• disconnecting:
	  • power leads
	  • water pipes/hoses and drains
	  • electrical leads
	• ensuring that any stabilising fixtures are correctly positioned for travel
	The purpose of the preparation may include:
	• to eliminate danger
	• eliminate potential damage
	• avoiding weight shift during towing
	• evenly distributing weight over wheels
	• avoiding other problems with towing

Braking systems	Braking systems may include: • hydraulic • electric
Pre-operational checks	Pre-operational checks may include: • visual check of vehicle • checking and topping up fluid levels • checking tyre pressures • checking operation of vehicle lights and indicators • checking brakes
Minor routine repairs	Minor routine repairs may include: • the replacement of blown globes in vehicle lights • replacement of broken belts • dealing with flat battery • replacement of blown fuses

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RANGE STATEMENT	
	• replacement of coolant hose • repairing door mirrors • repairs to rear tail-light lens • changing of tyres • repair of tyre punctures • replacement of broken coolant hose
Vehicle handling procedures	Vehicle handling procedures may include: • starting a vehicle • steering and manoeuvring a vehicle • accelerating and braking • positioning and stopping a vehicle • reversing a vehicle • correct hand positions on wheel • operating vehicle controls, instruments and indicators • using defensive driving techniques • managing engine performance
Driving hazards	Driving hazards may include: • wet and iced roads • steep inclines or sharp curves on the road • uneven surfaces • oil, rocks, mud and water on road • animals and objects on road • pedestrians and children • trees and branches • other vehicles, recreational vehicles or tents • foggy, windy or rainy conditions • flooded sections of road • fire in vehicle • leaking fuel • faulty brakes • parked vehicles on the road • faulty steering mechanism on vehicle • wet/oily work area surface • fixed workplace hazards • movable workplace hazards • other workers
Road transport situations	Road transport situations may include:

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RANGE STATEMENT	
	• positioning recreational vehicle • ensuring vehicle is level and parallel • ensuring vehicle is within reach of desired services/equipment
Occupational health and safety (**OHS**)	OHS may include: • safe worksite work practices • safe use of tools and equipment • safe handling of materials • use of personal protective equipment

Unit Sector(s)

Unit sector	

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSARVS201A Install LP gas systems in a recreational vehicle

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the skills and knowledge required to determine LP gas system requirements, and install and commission LP gas systems in a recreational vehicle. It applies to those involved in the manufacture of recreational vehicles in various types of enterprises. This unit is based on and equivalent *CPCPGS3006A Install LPG systems in caravans, mobile homes, water craft and mobile workplaces*.

Application of the Unit

Application of the unit	This unit of competency applies to those involved in recreational vehicle manufacturing. It may be applied in different workplaces, sectors and circumstances and applies only where relevant state/territory licensing requirements permit the installation of LP gas systems in a recreational vehicle. Licensing arrangements required by state/territory and national authorities may vary. This unit requires the determination of requirements, the installation and commissioning of LP gas systems with an operating pressure not exceeding 2.75 kPa in a recreational vehicle.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine LP gas system requirements	1.1. Use appropriate personal protective equipment and read and interpret any safety information relevant to the job 1.2. Obtain and interpret plans/specifications 1.3. Identify and adhere to quality assurance requirements for enterprise operations 1.4. Determine gas load/design requirements from design drawing or specifications 1.5. Calculate storage capacity using recognised formulae or tables to ensure adequacy for the required load and compliance with standards and job requirements 1.6. Identify appropriate regulator and piping in terms of size, connection sizes and capacity in accordance

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ELEMENT	PERFORMANCE CRITERIA
	with standards and enterprise requirements 1.7. Check that piping selected provides minimum inlet pressure to each appliance and is appropriate for the dimensions and loads given in the design drawings or instructions 1.8. Identify location of cylinders, appliances and piping set-out according to job requirements, standards and enterprise requirements 1.9. Estimate quantity of piping, components and fittings in accordance with standards and enterprise requirements 1.10. Check that type of system selected (one or two cylinders) is appropriate for given design information
2. Prepare for installation	2.1. Estimate required materials, equipment, appliances and cylinders from design drawing or on-site dimensions, and check for compliance with docket/order form and confirm acceptable condition 2.2. Identify and select appropriate tools and equipment for the installation 2.3. Use appropriate personal protective equipment, and read and interpret any safety information relevant to the job 2.4. Set out the piping system in accordance with design drawing or instructions, standards and enterprise requirements
3. Install the system	3.1. Install cylinders, regulators, associated pipework, appliances and fixings, including ventilation, in accordance with job requirements, standards and enterprise procedures 3.2. Locate and fit consumer instruction plates and labels in accordance with regulatory requirements, standards and enterprise requirements
4. Test the system	4.1. Adjust regulator to provide flow pressure in accordance with standards and enterprise requirements 4.2. Select test apparatus appropriate for the work 4.3. Test the system, including ventilation, in accordance with standards and enterprise requirements 4.4. Adjust the system to provide the required flow pressure in accordance with standards and enterprise requirements

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ELEMENT	PERFORMANCE CRITERIA
	4.5. Record test data in the format required by relevant regulatory and enterprise requirements
5. Finalise the job	5.1. Assess job against the requirements of the job specification 5.2. Conduct a final inspection in accordance with enterprise quality standards and requirements 5.3. Complete any paperwork required in accordance with enterprise requirements 5.4. Complete required clean-up procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • reading and interpreting instructions and specifications • using and selecting tools and equipment • using and caring of tools and equipment, including portable and fixed power tools • planning and organising work activities • maintaining work area
Required knowledge
Required knowledge includes: • components and products manufactured by the enterprise • general duty of care requirements • properties of gas, gas and electrical safety, combustion principles, pressure and flow rates, and types of systems • relevant statutory and authority requirements related to the installation and testing of gas systems • the International System of Units (SI) and calculation of storage capacity • installation procedures and processes • sources of information, including the appropriate standards • the materials requirements determination process • procedures for installing and commissioning gas systems in recreational vehicles • occupational health and safety (OHS) requirements, including staff responsibilities,

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REQUIRED SKILLS AND KNOWLEDGE
when working with gas, emergency procedures in case of an LP gas leak, LP gas material safety data sheets (MSDS), safety when working with fumes, and the selection and use of personal protective equipment • signage for hazardous materials and chemicals • working drawings of components manufactured by the enterprise

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Critical aspects of assessment	Evidence of the following is critical: • installing an LP gas container, piping and two (2) appliances (stove and refrigerator) in a recreational vehicle • completing work to specifications, plans and drawings • complying with regulations, standards and enterprise quality procedures and processes • complying with all safety and OHS requirements, including use of personal protective equipment • effectively communicating with others in the team.
Context of assessment and resource implications	Assessment must ensure: • demonstration of the installation of a gas container, piping and a minimum of two (2) appliances for a recreational vehicle • demonstration of skills within a suitable workshop with appropriate tools, equipment and materials, and access to appropriate standards.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Recreational vehicles	Recreational vehicles may include: • caravan • pop-top caravan • camper trailer • tent trailer • 5th wheeler • slide-on camper • campervan
Manufacturing enterprise	The manufacturing enterprise may include: • sole proprietor • subcontractor • subcontracting manufacturer • employer/manufacturer
The LP gas system	The LP gas system includes: • cylinder (one or two) • regulator • piping • appliances and fixings • air supply • ventilation
Quality assurance	Quality assurance requirements include: • International Standards Organisation (ISO) • internal enterprise quality assurance policy and risk management strategy • Environment Protection Authority (EPA) • AS 5601:2004 Gas installations • AS/NZ 1596:2008 The storage and handling of LP gas • site safety plans • enterprise operations and procedures • relevant industry codes of practice, such as

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RANGE STATEMENT	
	those issued by the Recreational Vehicle Manufacturer's Association of Australia (RVMAA)
Tools and equipment	Tools and equipment may include: • hacksaws • power cutting/grinding tools • measuring equipment • wrenches and spanners • files • flaring tools • silver brazing equipment • testing equipment • lifting/load shifting equipment, including trolleys, rollers, forklifts, blocks, hoists and jacks
Materials	Materials must comply with job specifications and appropriate standards for installation of LP gas systems and include: • gas operated appliances • gas regulators • gas cylinders • copper tubing • stainless steel • non-metallic hose assemblies • fitting/fixing materials
Occupational health and safety (OHS) requirements	OHS requirements are to be in accordance with state/territory legislation and regulations and include: • safe workshop environment/worksite work practices • safe use of tools and equipment • safe handling of materials • hazard control and hazardous materials and substances • use of personal protective equipment
Personal protective equipment	Personal protective equipment may include: • overalls • boots • hard hat/cap

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RANGE STATEMENT	
	• safety glasses/goggles • gloves • ear plugs/muffs • face masks/respirators
Clean-up procedures	Clean-up procedures may include: • cleaning working surfaces and areas • cleaning and storing all tools and equipment • disposing of waste materials correctly

Sources of information	Sources of information may include:
	• job instructions, signage, plans, specifications, drawings, MSDS and diagrams
	• safe work procedures relating to the installation of LP gas systems for a recreational vehicle
	• regulatory/legislative requirements, pertaining to plumbing and gas fitting regulations, building codes, OHS and environmental requirements
	• enterprise specifications and instructions
	• recognised formulae or tables accepted by the regulatory authority
	• instructions issued by authorised enterprise personnel
	• relevant standards, such as:
	  • AS 5601:2004 Gas installations
	  • AS/NZ 1596:2008 The storage and handling of LP gas

Unit Sector(s)

Unit sector	

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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MSARVS202A Repair/service LP gas systems in a recreational vehicle

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the skills and knowledge required to repair LP gas systems in a recreational vehicle. It applies to those working in a servicing agency or in the service section of a manufacturing enterprise.

Application of the Unit

Application of the unit	This unit of competency applies to those who are responsible for recreational vehicle servicing. It applies only where relevant state/territory licensing requirements permit the repair and service of LP gas systems in a recreational vehicle. Licensing requirements by state/territory and national authorities may vary. The unit requires the determination of requirements and the repair or service of LP gas systems with an operating pressure not exceeding 2.75 kPa in a recreational vehicle.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify repair requirements	1.1. Identify or verify service or repair needs to LP gas system 1.2. Access and interpret working drawings, plans and job specifications according to model and type of recreational vehicle 1.3. Select tools and equipment to meet the job requirements and check them to ensure they are working safely 1.4. Identify any safety hazards associated with the job and use appropriate personal protective equipment
2. Assess the system	2.1. Identify and adhere to quality assurance requirements for repair or service 2.2. Assess storage capacity and regulator size to ensure they are adequate for the load and do not exceed regulatory requirements and standards 2.3. Ensure that piping and ventilation used comply with regulatory requirements and standards 2.4. Evaluate the system's piping size to ensure it is appropriate for the dimensions and loads 2.5. Check to ensure that size used for main run and branches provides minimum inlet pressure to each appliance in accordance with regulatory requirements and standards 2.6. Check the set-out of the piping system to ensure

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ELEMENT	PERFORMANCE CRITERIA
	correct position for appliances and cylinders and compliance with regulatory requirements and standards
3. Plan and prepare the job	3.1. Plan all necessary and appropriate tasks in conjunction with others involved in or affected by the work 3.2. Inform appropriate authorities of planned work and obtain and submit work notices, where required 3.3. Estimate and order any required materials, equipment and appliances for the job and organise delivery 3.4. Check materials, equipment and appliances delivered against the order form or delivery docket to ensure they correspond and are in an acceptable condition 3.5. Identify and select appropriate tools and equipment for the repair/service 3.6. Use appropriate personal protective equipment and read and interpret any safety information relevant to the job
4. Service/repair system	4.1. Service system, repair fault or install appliance in accordance with job requirements, standards and manufacturer specifications 4.2. Repair piping system in accordance with job requirements and standards 4.3. Position appliances to ensure adequate air supply and ventilation in accordance with job requirements and standards 4.4. Locate and check consumer instruction plates, labels and compliance plates to ensure they comply with regulatory requirements and standards
5. Test the system	5.1. Adjust regulator to provide flow pressure in accordance with standards and enterprise requirements 5.2. Select test equipment which is appropriate for the work 5.3. Test the system, including ventilation, in accordance with standards and enterprise requirements 5.4. Adjust the system to provide the required flow pressure in accordance with standards and enterprise requirements

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ELEMENT	PERFORMANCE CRITERIA
	5.5. Record test data in the format required by relevant regulatory and enterprise requirements
6. Complete the job	6.1. Assess work against the requirements of the job 6.2. Assess quality of the total job in accordance with enterprise standards and requirements 6.3. Complete all required paperwork for both customer and enterprise records 6.4. Complete required clean-up procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- reading and interpreting instructions and specifications
- using portable and fixed power tools and equipment correctly and safely
- planning and organisation of work
- maintaining and cleaning work area
- communicating effectively with others
- recording data and monitoring records

Required knowledge

Required knowledge includes:

- components and products sourced or manufactured by the enterprise
- general duty of care requirements
- properties of gas, gas and electrical safety, combustion principles, pressure and flow rates, and types of systems
- relevant legislative and regulatoryrequirements related to the installation and testing of gas systems
- the International System of Units (SI) and calculation of storage capacity
- installation procedures and processes
- typical problems and faults associated with LP gas systems in recreational vehicles
- sources of information, including the appropriate standards
- the materials requirements determination process
- procedures for installing and commissioning gas systems in recreational vehicles

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REQUIRED SKILLS AND KNOWLEDGE
• occupational health and safety (OHS) requirements, including staff responsibilities when working with gas, emergency procedures in case of an LP gas leak, LP gas material safety data sheets (MSDS), safety when working with fumes, and the selection and use of personal protective equipment • signage for hazardous chemicals and materials • working drawings of components manufactured by the enterprise

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Critical aspects of assessment	Evidence of the following is critical: • accurately assessing job requirements and problems related to repair of the LP gas system of a recreational vehicle and selecting appropriate solutions • completing work to meet customer requirements of agreed job, timelines and cost • applying customer service skills • complying with all regulatory, quality assurance, OHS and enterprise requirements.
Context of assessment and resource implications	Assessment must ensure: • demonstration of the repair or replacement of a gas container, piping and a minimum of two (2) appliances for a recreational vehicle • demonstration of skills within a suitable workshop with appropriate tools, equipment and materials, and access to appropriate standards • project or work activities that allow the candidate to use the full range of skills and knowledge to respond to a range of typical situations and problems.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Recreational vehicles	Recreational vehicles may include: • caravan • pop-top caravan • camper trailer • tent trailer • 5th wheeler • slide-on camper • campervan
Customers	Customers may include: • tourists • recreational vehicle owners • park owners/managers • recreational vehicle retailers • recreational vehicle service contractors • insurance companies
LP gas system	The LP gas system may include: • cylinder (one or two) • regulator • piping • appliances and fixings • air supply • ventilation
Quality assurance requirements	Quality assurance requirements may include: • International Standards Organisation (ISO) • internal enterprise quality assurance policy and risk management strategy • Environment Protection Authority (EPA) • AS 5601:2004 Gas installations • AS/NZ 1596:2008 The storage and handling of LP gas

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RANGE STATEMENT	
	• site safety plans • enterprise operations and procedures • relevant industry codes of practice, such as those issued by the Recreational Vehicle Manufacturer's Association of Australia (RVMAA)
Regulatory authorities	Regulatory authorities may include: • statutory plumbing authority • statutory gas authority • state/territory or local statutory authority
Tools and equipment	Tools and equipment may include: • hacksaws • power cutting/grinding tools • measuring equipment • wrenches and spanners • files • flaring tools • silver brazing equipment • testing equipment • lifting/load shifting equipment, including trolleys, rollers, forklifts, blocks, hoists and jacks
Materials	Materials must comply with job specifications and appropriate standards for installation of LP gas systems and may include: • gas operated appliances • gas regulators • gas cylinders • copper tubing • stainless steel • non-metallic hose assemblies • fitting/fixing materials
Occupational health and safety (OHS) requirements	OHS requirements are to be in accordance with state/territory legislation and regulations and may include: • safe workshop environment/worksite work practices • safe use of tools and equipment • safe handling of materials

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RANGE STATEMENT	
	• hazard control and hazardous materials and substances • use of personal protective equipment
Personal protective equipment	Personal protective equipment may include: • overalls • boots • hard hat/cap • safety glasses/goggles • gloves • ear plugs/muffs • face masks/respirators
Clean-up procedures	Clean-up procedures may include: • cleaning working surfaces and areas • cleaning and storing all tools and equipment • disposing of waste materials correctly

Sources of information	Sources of information may include:
	• job instructions, signage, plans, specifications, drawings, MSDS and diagrams
	• safe work procedures relating to the installation of LP gas systems for a recreational vehicle
	• regulatory/legislative requirements, pertaining to plumbing and gas fitting regulations, building codes, and OHS and environmental requirements
	• enterprise specifications and instructions
	• recognised formulae or tables accepted by the regulatory authority
	• instructions issued by authorised enterprise personnel
	• relevant standards, such as:
	  • AS 5601:2004 Gas installations
	  • AS/NZ 1596:2008 The storage and handling of LP gas

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Unit Sector(s)

Unit sector	

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSARVS301A Develop and update caravan industry knowledge

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the skills and knowledge required to develop, update and utilise general knowledge of the caravan industry, including recreational vehicle manufacturing, servicing, retail and caravan parks.

Application of the Unit

Application of the unit	This unit of competency applies to those involved in the retail sector of the recreational vehicle industry. It may be applied in different workplaces, sectors and circumstances. It provides the knowledge which underpins effective performance in the retail sector. In-depth knowledge is not required. It does not address the technical knowledge of recreational vehicle manufacturing which is addressed in *MSARVT202A Apply technical knowledge of recreational vehicle manufacturing to work activities*.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Research information on the caravan industry	1.1. Identify and access sources of information on the caravan industry 1.2. Research information using appropriate sources for various requirements 1.3. Access specific information on relevant sector of work and related job roles and responsibilities
2. Apply technical information on recreational vehicles to work activities	2.1. Access current information about the caravan industry and issues of interest 2.2. Apply industry information in day-to-day work activities to enhance the quality of work performance
3. Develop and apply information on legal and ethical issues which impact on the caravan industry	3.1. Obtain information on legal and ethical issues to assist effective work performance 3.2. Conduct day-to-day activities in accordance with legal obligations and ethical industry practices
4. Update caravan industry knowledge	4.1. Identify and use a range of opportunities to update general knowledge of the caravan industry 4.2. Monitor issues of current concern and interest to the industry 4.3. Share updated knowledge with customers and

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ELEMENT	PERFORMANCE CRITERIA
	colleagues, as appropriate, and incorporate into day-to-day working activities

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • Basic research skills to identify and research relevant information • questioning to obtain information • sorting and summarising information • communicating effectively with others • planning and organising work activities
Required knowledge

Required knowledge includes:
• general knowledge of caravan industry sectors and interrelationships, including:
  • manufacturing
  • service
  • retail
  • major caravan and tourism industry bodies
  • functions and responsibilities
• caravan park operations, including:
  • accommodation
  • maintenance
  • service/repair
  • emergency and safety requirements
  • environmental issues, such as waste and water management, and energy conservation
• general knowledge of the tourism industry, including:
  • tour operators and wholesalers
  • retail travel agents
  • information services sector (local, regional and national)
  • attractions

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REQUIRED SKILLS AND KNOWLEDGE
• quality assurance in the caravan industry and the role and responsibility of individual staff members • the importance and implications of customer service in the caravan industry • legislation (both state and federal) that applies across the industry in the following areas (name, primary objective and impact on individual staff only): • consumer protection and trade practices • duty of care • equal employment opportunity • anti-discrimination • workplace relations • regulations (local government) • legislation and regulations relating to recreational vehicles • general industry knowledge • economic and social significance of the caravan industry • growth potential of the caravan industry and career opportunities • caravan industry trends • caravan industry support businesses • caravan park rating systems and their application in metropolitan, regional and Australia-wide locations • factors which contribute to the development of successful caravan parks • relationship of the caravan park industry to other sectors of the hospitality and tourist industry (hotels and motels) • environmental and safety issues in the caravan industry • social profiles of caravaners and campers: • customer needs and the importance of having a customer service culture • industry associations

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Critical aspects of assessment	Evidence of the following is critical: • ability to source industry information • general knowledge of the caravan industry, including main roles, functions and interrelationships of

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EVIDENCE GUIDE	
	different sectors, with a more detailed knowledge of issues that relate to a specific sector or workplace.
Context of assessment and resource implications	Assessment must ensure: • project or work activities that allow the candidate to demonstrate the application of knowledge to specific caravan industry contexts and situations.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Sources of information	Sources of information may include: • media • reference books • libraries • unions • industry associations and organisations • industry personnel • industry journals • computer software and Internet • personal observation and experience
Current information	Current information about the caravan industry and issues of interest may include: • economic and social significance of the caravan industry and the role of local communities • growth potential of the caravan industry and career opportunities • main sectors of the caravan industry and their

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RANGE STATEMENT	
	functions and responsibilities • caravan industry trends • caravan industry support businesses • types of accommodation available in caravan parks • caravan park rating and accreditation systems • factors which contribute to the development of successful caravan parks • relationship of the caravan park industry to other sectors of the hospitality and tourist industry (hotels and motels) • environmental and safety issues • social profiles of caravaners and campers • customer needs and the importance of having a customer service culture • caravan industry associations • relationship between the caravan industry and the broader tourism industry
Sectors of the caravan industry	Sectors of the caravan industry may include: • caravan or holiday park operations • recreational vehicle manufacturing • recreational vehicle parts and components manufacturing and supply • recreational vehicle servicing • recreational vehicle and accessories retailing
Caravan industry support businesses	Caravan industry support businesses may include: • hospitality • tourism operations • entertainment, sports and activities • meetings and conferences • trades, horticulture and maintenance • conservation bodies • local councils, tourism authorities and promoters • retail and wholesale suppliers • recreational vehicle and accessories retailing • security
Environmental issues	Environmental issues may include: • protection of natural and cultural integrity

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RANGE STATEMENT	
	• minimal impact operations • environmental sustainability • water management • waste management • energy efficient operations • land ownership • land access and usage
Legal issues	Legal issues may include: • consumer protection • duty of care • equal employment opportunity and affirmative action • anti-discrimination • workplace relations • public liability and risk • residential tenancy legislation • local government regulations • occupational health and safety (OHS) legislation • taxation legislation
Ethical issues	Ethical issues may include: • confidentiality • commission procedures • overbooking • pricing • tipping • familiarisations • gifts and services provided free of charge • product recommendations
Issues of interest and concern	Issues of interest and concern may include: • government initiatives (federal, state/territory and local) • emerging markets • environmental and social issues • labour issues • industry expansion or retraction

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Unit Sector(s)

Unit sector	

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSARVS401A Assess and quote to service a recreational vehicle

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the skills and knowledge required to assess and quote a job to repair and/or service a recreational vehicle. It applies to those working in a servicing enterprise where assessing and quoting jobs is required.

Application of the Unit

Application of the unit	This unit of competency applies to those involved in enterprises conducting recreational vehicle servicing and repairs where assessing and quoting the job is required. It may be applied in different workplaces, sectors and circumstances.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Assess job requirements	1.1. Assess any damage and/or identify service requirements 1.2. Select and review relevant plans, drawings or manuals according to type and model of recreational vehicle 1.3. Determine accurately the service and/or repair requirements of the job 1.4. Provide advice or make recommendations on repair and/or service, on request 1.5. Identify any options to meet customer preferences and specific job requirements 1.6. Consider and recommend any additional services which may be required
2. Quote the job	2.1. Select repair or service options and agree on scope in consultation with customer 2.2. Identify and calculate materials, parts and equipment required to meet the job requirements and appropriate sources 2.3. Calculate the costs of the job 2.4. Prepare quotation and present to customer in a professional manner 2.5. Obtain customer's agreement to quotation, details of work to be completed and timeframes

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ELEMENT	PERFORMANCE CRITERIA
	2.6. Order parts, materials and equipment, where required, according to enterprise procedures 2.7. Liaise with colleagues and others, where required, to organise the job 2.8. Complete any documentation and file appropriately according to enterprise procedures 2.9. Schedule the job, as appropriate, in agreement with customer and follow booking procedures according to enterprise practices

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- planning and organising work activities
- applying customer service, negotiation and communication skills
- estimating and calculating materials, parts, time and labour costs
- reading and interpreting typical floor plans, drawings and manuals of recreational vehicles

Required knowledge

Required knowledge includes:

- relevant industry codes of practice, such as those issued by the Recreational Vehicle Manufacturer's Association of Australia (RVMAA)
- features of different recreational vehicle types and makes, and their design and structural features
- recommended service and maintenance requirements and schedules for recreational vehicles
- details, features and current costs of components, materials and parts
- required equipment for the job and any associated costs and transport requirements

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Critical aspects of assessment	Evidence of the following is critical: • accurately assessing job requirements and costs • identifying and assessing problems and selecting appropriate remedies • negotiating and applying customer service skills.
Context of assessment and resource implications	Assessment must ensure: • work activities that allow the candidate to prepare a quotation for a range of typical service and repair situations and problems, including repair/service of chassis, walls, roof, furnishing and piping/wiring for services, accessories, appliances and running gear.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Recreational vehicles	Recreational vehicles may include: • caravan • pop-top caravan • camper trailer • tent trailer • 5th wheeler • slide-on camper • campervan

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RANGE STATEMENT	
	• motor home
Customers	Customers may include: • recreational vehicle owners/users • recreational vehicle retailers • recreational vehicle service contractors • insurance companies
Materials, **parts and equipment**	Materials, parts and equipment may include: • hand and power tools • small plant • replacement materials, floor coverings, panelling and furnishings • components and running gear • parts and accessories
Repair or service costs	Repair or service costs may include: • labour • materials • parts • fixtures and fittings • appliances • equipment (use or hire)

Unit Sector(s)

Unit sector	

Competency field

Competency field	

Co-requisite units

Co-requisite units	

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Co-requisite units		

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MSARVT201A Apply technical knowledge of recreational vehicle manufacturing to work activities

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the basic technical knowledge required to conduct a range of work activities in the recreational vehicle manufacturing, servicing and retail sectors of the caravan industry.

Application of the Unit

Application of the unit	This unit of competency applies to those involved in the manufacturing, servicing and retail sectors of the recreational vehicle industry. It may be applied in different workplaces, sectors and circumstances. This unit applies to roles performed by recreational vehicle manufacturing and service personnel, recreational vehicle and accessories sales personnel, recreational vehicle designers and manufacturers.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Apply technical information on recreational vehicles to work activities	1.1. Identify sources of current information on recreational vehicle manufacturing 1.2. Access and update information relevant to work activities 1.3. Apply technical information regarding the manufacture of recreational vehicles and accessories to work activities
2. Identify relevant information on regulatory and legal requirements to work activities	2.1. Apply information on legal and regulatory obligations to assist in effective work performance 2.2. Monitor issues of current concern to the industry 2.3. Conduct day-to-day activities in accordance with legal and regulatory obligations, industry practices and enterprise procedures 2.4. Share knowledge with customers and colleagues, as appropriate, and incorporate into day-to-day work activities
3. Apply information on products to work activities	3.1. Apply information on products produced both within and outside the enterprise to work activities 3.2. Apply information about models, parts, accessories and options to meet customer requirements/requests and enterprise needs

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • interpreting instructions and specifications • following procedures • identifying and accessing relevant information from a range of sources • communicating effectively with others • planning and organising work activities
Required knowledge
Required knowledge includes: • working drawings of recreational vehicles and components manufactured by the organisation as appropriate • relevant components, products and accessories manufactured by the enterprise • recreational vehicle structural knowledge appropriate to the job • characteristics and uses of materials used for recreational vehicle manufacture appropriate to the job • tolerances, loads, weight bearing and weight distribution relevant to the job • legal obligations, including general duty of care, occupational health and safety (OHS) and safety regulations relevant to the job • licensing requirements for use of gas, electrical wiring, air conditioning and welding and related as relevant to the job

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Critical aspects of assessment	Evidence of the following is critical: • applying technical knowledge to relevant work situations • understanding of all relevant OHS, regulatory and legislative requirements

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EVIDENCE GUIDE	
	• understanding and applying safety aspects related to the design, manufacture and service of recreational vehicles relating to job role.
Context of assessment and resource implications	Assessment must ensure: • demonstration of application of knowledge to a range of typical work-related situations • work activities that allow the candidate to respond to typical challenges involved in the manufacture, service or sales of recreational vehicles in order to meet customer and enterprise requirements.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Recreational vehicle	Recreational vehicles may include: • caravan • pop-top caravan • camper trailer • tent trailer • 5th wheeler • slide-on camper • campervan • motor home
Sources of current information	Sources of current information on recreational vehicles manufacturing may include: • types, models and options currently available • local and overseas manufacturing • technical information

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RANGE STATEMENT	
	• regulatory and legal requirements
Apply technical information	Technical information may be applied to work activities to meet: • product • design • enterprise • customer • safety requirements
Work activities	Work activities may include: • manufacturing • servicing recreational vehicles and parts • designing • marketing • sales of recreational vehicles and accessories
Technical information	Technical information may include: • types and models of recreational vehicles • designs and design features and limitations • materials used for different models and components • structure • components, accessories and options
Legal and regulatory obligations	Legal and regulatory obligations may include: • codes of practice of the Recreational Vehicle Manufacturers' Association of Australia (RVMAA) • licensing requirements related to installation, servicing and repair of gas, electrical, plumbing, air conditioning fittings and wiring • welding, joining and adhesives • government (federal, state/territory and local) legislation
Information on products	Information on products may include: • options for components, fittings and accessories • options for layout, furniture, colour schemes, fabrics and finishes • customer requests and feedback • enterprise quality assurance processes, and

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RANGE STATEMENT	
	design limitations and improvements

Unit Sector(s)

Unit sector	

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATCM301A Test the mechanical properties of materials

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers the knowledge and skills needed to carry out mechanical (destructive) tests on materials and interpret the results.

Application of the Unit

Application of the unit	In a typical scenario, a technician will be required to undertake a range of mechanical tests on samples of materials and to draw some conclusions from those tests with regard to the mechanical properties of the material.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

Employability Skills Information

Employability Skills	This unit contains employability skills

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Select appropriate testing procedures/ standards	1.1. Identify the relevant testing standard 1.2. Identify the need (or otherwise) for testing using a certified laboratory/test equipment 1.3. Select appropriate procedures/standards for the requirements of the test 1.4. Prepare sample according to appropriate procedures 1.5. Arrange for external testing if appropriate. 1.6.
2. Conduct tensile/compression testing	2.1. Undertake tensile test noting relevant data 2.2. Calculate tensile/compressive properties 2.3. Draw relevant conclusions from the tensile test. 2.4.
3. Conduct hardness testing.	3.1. Identify appropriate method of hardness testing 3.2. Undertake hardness test noting relevant data 3.3. Calculate hardness properties 3.4. Draw relevant conclusions from the hardness test 3.5.
4. Conduct impact testing	4.1. Undertake impact test noting relevant data 4.2. Determine impact properties 4.3. Draw relevant conclusions from the impact test 4.4.
5. Conduct fatigue/ flexing testing	5.1. Undertake fatigue/flex testing noting relevant data 5.2. Interpret fatigue/flexing data 5.3. Draw relevant conclusions from the fatigue/flexing test 5.4.
6. Conduct creep testing	6.1. Undertake creep test noting relevant data 6.2. Interpret creep data 6.3. Draw relevant conclusions from the creep test 6.4.
7. Undertake strain measurements	7.1. Identify appropriate method of strain measurement 7.2. Undertake strain measurement and note relevant data 7.3. Interpret strain measurement results

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ELEMENT	PERFORMANCE CRITERIA
	7.4. Draw relevant conclusions from strain measurements 7.5.
8. Conduct static shear and bend test	8.1. Identify appropriate method of static shear and bend test 8.2. Undertake static shear and bend tests noting relevant data 8.3. Interpret static shear and bend test data 8.4. Draw relevant conclusions from static shear and bend tests 8.5.
9. Report result of tests	9.1. Identify reporting requirements 9.2. Prepare report to meet requirements 9.3. Circulate and file report to procedures. 9.4.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
• analyse • select and set up appropriate tests • problem-solve • **perform tests** • interpret results • report results
Required knowledge

• standards
  • needs for standards
  • standards organisations
  • structure and operations of SAA
  • (Standards Association of Australia)
• role of NATA (National Association of Testing Australia)
  • tensile testing
  • methods for tensile testing e.g. AS1391 or equivalent international standard
  • determination of tensile properties
• general impact testing

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REQUIRED SKILLS AND KNOWLEDGE
• factors affecting impact properties of materials • impact testing (AS 1544), or equivalent international standard • dropweight Tear Test (AS 1330) or equivalent international standard • hardness testing • Vickers Hardness Testing (AS 1817, Part 1) or equivalent international standard • Brinell Hardness Testing (AS 1816, Part 1) or equivalent international standard • Rockwell Hardness Testing (AS 1815, Part1) or equivalent international standard • other Hardness Testing Methods (e.g. Equotip and other rebound methods) • fatigue/flex testing • factors affecting the fatigue/flex properties materials • fatigue testing procedures • presentation of Fatigue properties • creep testing • factors affecting creep behaviour of materials • creep testing procedures • stress-rupture testing • presentation of Creep properties

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for the training package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to test the mechanical properties of materials. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • Conduct tests and interpret results. Evidence should be provided from a number of each type of mechanical test.
Relationship with other units	This unit may be assessed concurrently with other

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EVIDENCE GUIDE	
	relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment. Assessment will need to occur in a situation where mechanical testing is undertaken.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work

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RANGE STATEMENT	
environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Mechanical tests	Mechanical tests include tensile, impact, hardness, fatigue/flexing and creep.
Materials	Materials includes metals, polymer based materials and other solid materials on which mechanical testing is relevant
Testing standard	Testing standard include ASNZ, ISO, ASTM, DIN or other relevant standard.
Certified	Certified equipment/laboratory refers to NATA certification or relevant equivalent.
Tensile/compressive properties	Tensile properties include: • tensile strength, • compressive strength, • elongation, • reduction of area, • yield stress, • yield point, • proof stress, • Young's modulus • elastic/plastic region and deformation or viscoelastic deformation..
Impact test	Impact testing includes Izod, Charpy, Dropweight Tear and NDT tests.
Impact properties	Impact properties include ITT, USE, Notch Sensitivity
Hardness test	Hardness testing includes Vickers, Brinell, Rockwell and Durometer tests.
Strain measurements	Strain measurements include foil method, extensometer and destructive tests

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Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM302A Monitor ferrous melting and casting processes

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers the knowledge and skills needed to monitor the melting and casting of the alloys of iron, steel

Application of the Unit

Application of the unit	In a typical scenario, a technician will be required to monitor a ferrous melting and casting operation, ensuring that correct quantities and temperatures are used and correct procedures followed.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

Employability Skills Information

Employability Skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify specifications for required casting	1.1. Identify required material specification 1.2. Identify mould requirements 1.3. Identify any special requirements for this job
2. Verify metal charges to melting	2.1. Select required components to give the required metal specification 2.2. Calculate required charge of each component 2.3. Recommend changes/additions to the charge 2.4. Monitor the preparation of the charge including checking for contaminants
3. Monitor furnace operation	3.1. Check that the furnace is in good operational condition and that appropriate lining is present 3.2. Organise for maintenance/repairs as required 3.3. Monitor a melt to ensure the product meets specification
4. Monitor pouring of molten metal	4.1. Check that the ladle is in good operational condition and that appropriate lining is present 4.2. Check pouring is to procedures 4.3. Take required samples for analysis
5. Control hazards	5.1. Identify hazards in the metal melting/pouring process 5.2. Assess the risks arising from those hazards 5.3. Implement procedures to control those hazards in line with procedures and duty of care.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:

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REQUIRED SKILLS AND KNOWLEDGE

- take calculations needed for determining charges
- perform visual checking of furnaces for operational condition and safety risks
- take of samples
- follow safety and quality procedures

Required knowledge:

- Charge Calculations
  - importance of composition control.
  - methods of calculation used to correct for
  - additions.
  - types of alloy additions.
- Steel
  - induction furnace melting; principles; refractories.
  - arc furnace melting; acid, basic, single slag,
  - double slag, deoxidisation, hydrogen control.
  - ladle refining
- Cast iron
  - types of cast iron
  - influence of carbon and silicon contents
  - carbon equivalent. effect of cooling rate.
  - microstructure, classification of graphite.
  - carbide stabilisers and graphite.
  - innoculation, types of innoculant.
  - spheroidal graphite formation and treatment
  - methods.
  - casting characteristics of grey, S.G and malleable
  - cast irons.
- Ferrous alloys:
  - definitions:
  - iron
  - steel
  - physical properties:
  - density
  - tensile
  - hardness
  - melting points
  - shrinkage percent
  - casting temperature

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REQUIRED SKILLS AND KNOWLEDGE

- S.G. iron
- ductile iron
- carbon steel
- grey and white irons
- alloy cast irons
- alloys steels
- chilled and malleable iron
- selection:
- customer requirements
- manufacturer's requirements
- metal analysis
- Australian standards

- Types of furnaces:
  - blast furnace
  - cupola
  - induction
  - direct arc
  - indirect arc
  - open hearth
  - reverberatory
  - rotary
  - maintenance
- Refractories:
  - dolomite
  - silica brick
  - chrome brick
  - ganister
  - fireclay
  - firebrick
  - magnesite
  - kyanite
  - fused alumina
- Linings:
  - monolithic
  - castable
  - rammable
  - bricks
  - basic

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REQUIRED SKILLS AND KNOWLEDGE

- acid
- neutral

- Types of ladles:
  - lip
  - tea pot
  - bottom pour
  - safety with ladles
  - maintenance
- Safety:
  - house keeping
  - personal clothing/gear
  - dry area
  - pre-heat ladles
  - overhead cranes
- Furnace operation:
  - personal clothing/gear
  - dry charge/equipment
  - pre-heating
  - scrap selection
  - house keeping
  - melting program
  - alloying program
  - calculations
  - percentages, ratio
  - charge calculations
  - maintenance
- Types of control equipment:
  - carbon equivalent
  - wedge test
  - fluidity spiral test
  - chemical analysis
  - wet
  - spectrograph
  - sample spoons
  - sample moulds
  - deoxidising
  - degassing
  - temperature measurement

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REQUIRED SKILLS AND KNOWLEDGE

• Quality control:
  • accurate weighing
  • correct analysis
  • temperature control
  • slag control (including chemistry and interaction with molten bath)
  • alloying procedure
  • thermal analysis
  • degassing
  • deoxidising
• Defects:
  • contamination
  • gas absorption
  • metal analysis
  • temperature control
  • oxidation
• Alloy production:
  • charge analysis
  • charge calculation
  • charge preparation
  • melt control
  • tapping/pouring

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the TrainingPackage.

Overview of assessment	A person who demonstrates competency in this unit must be able to monitor basic ferrous melting and casting processes. Critical aspects for assessment and evidence are required to demonstrate competency in this unit
Critical aspects for assessment and evidence required to demonstrate	It is essential that competence is demonstrated in the ability to:

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EVIDENCE GUIDE	
competency in this unit	• Monitor the melting and casting of ferrous metal. Evidence should be provided from a number of castings using different alloys and or different moulds. • Safely operate melting furnace • Safely handle pouring equipment
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an organisation where ferrous casting is done. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Contaminants	Contaminants include non specified metal, rubber, grease, water, paint and non-metallics, closed containers or pipes and pressure containers such as aerosols.
Material specification	Material specification includes ferrous metals and ferrous alloys as well as contaminants.

Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM303A Monitor non-ferrous melting and casting processes

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers the knowledge and skills needed to undertake the melting and casting of non-ferrous alloys

Application of the Unit

Application of the unit	In a typical scenario, a technician will be required to monitor a non - ferrous melting and casting operation, ensuring that correct quantities are used and correct procedures followed.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify specifications for required casting	1.1. Identify required material specification 1.2. Identify mould requirements 1.3. Identify any special requirements for this job
2. Verify metal charges to melting	2.1. Calculate required charge of each component 2.2. Select required components to give the required metal specification 2.3. Recommend changes/additions to the charge 2.4. Monitor the preparation of the charge including checking for contaminants
3. Monitor furnace operation	3.1. Check that the furnace is in good operational condition 3.2. Organise for maintenance/repairs as required 3.3. Monitor a melt to ensure the product meets specification
4. Monitor pouring of molten metal	4.1. Check pouring is to procedures 4.2. Take required samples for analysis
5. Control hazards	5.1. Identify hazards in the metal melting/pouring process 5.2. Assess the risks arising from those hazards 5.3. Implement procedures to control those hazards in line with procedures and duty of care

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE

Required skills:

- take calculations needed for determining charges
- visually check furnaces for operational condition and safety risks
- take samples
- follow safety and quality procedures

Required knowledge:

- Charge Calculations
  - importance of composition control.
  - methods of calculation used to correct for
  - additions.
  - types of alloy additions.
- Non-ferrous alloys
  - definition
  - physical properties
  - density
  - tensile
  - hardness
  - melting points
  - shrinkage percentage
  - fluidity
  - brass
  - bronze
  - gunmetal
  - copper based alloys
  - aluminium based alloys
  - lead
  - selection
  - requirements
  - × customer
  - × manufacturer's
  - metal analysis
  - Australian standards
- Types of furnaces
  - crucible
  - oil
  - gas
  - induction

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REQUIRED SKILLS AND KNOWLEDGE

- channel
- coreless
- resistance
- reverberatory
- maintenance

- Refractories
  - silica
  - ganister
  - coatings
  - others common to non-ferrous
- Linings
  - monolithic
  - castable
  - rammable
  - bricks
- Ladles/crucibles
  - types
  - ladles
  - crucibles
  - safety
  - maintenance
  - care of crucibles
  - porous plug
- Safety
  - house keeping
  - personal
  - clothing
  - gear
  - dry area
  - pre-heat ladles
  - overhead cranes
- Furnace operation
  - personal attire
  - dry charge
  - dry equipment
  - pre-heating
  - scrap selection
  - house keeping

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REQUIRED SKILLS AND KNOWLEDGE

- melting program
- alloying program
- charge calculations
- percentages
- ratio and proportion
- calculations
- volume
- mass
- operation
- maintenance

- Lifting and handling equipment
  - tongs
  - shanks
  - cranes
  - hoists
  - bogey ladles
  - maintenance
- Types of control equipment
  - thermal analysis
  - pyrometers
  - gas analysis
  - chemical analysis
  - wet
  - dry
  - spectrograph
  - fluidity
  - shrinkage test
- Quality control
  - accurate weighing
  - correct analysis
  - temperature control
  - covers and fluxes
  - mould/metal reactions
  - thermal analysis
  - degassing
  - deoxidising
  - ladle refining
- Defects

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REQUIRED SKILLS AND KNOWLEDGE

- contamination
- gas absorption
- metal analysis
- temperature control
- oxidation
- other defects common to non-ferrous metals
- methods of avoiding/overcoming defects

- Alloy production
  - charge
  - analysis
  - calculation
  - preparation
  - melt control
- Tapping/pouring
  - pouring method sequenced
  - temperature check
  - capacity requirements
  - ladle/crucibles
  - checks
  - preparation
  - pre-heating
  - transfer
  - × safety clips
  - filling
  - metal maintenance
  - covers/fluxes
  - temperature
  - metal pouring
  - mould condition
  - test bar
  - × reasons
  - × method
  - pig pouring and tagging
  - ladle/crucible return
  - emptying
  - cleaning
  - maintaining
  - lubrication

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REQUIRED SKILLS AND KNOWLEDGE
• -repairs to refractory • cleaning of refractory

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to monitor basic non-ferrous melting and casting processes. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to:
	• Monitor melting and casting operations
	  • Evidence should be provided from a number of castings using different alloys and or different moulds.
	  • Safely operate melting furnace
	  • Safely handle pouring equipment

Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond

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EVIDENCE GUIDE	
	those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an organisation where non-ferrous casting is done. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Mould	Moulds are sand, die and investment moulds.
Contaminants	Contaminants include non specified metal, rubber, grease, water, paint and non metallics, closed containers or pipes and pressure containers such as aerosols.
Material specification	Material specification includes non-ferrous metals and non -ferrous alloys as well as contaminants

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Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM304A Interpret basic binary phase diagrams

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers the knowledge and skills needed to interpret phase diagrams and so predict the microstructures of binary alloys.

Application of the Unit

Application of the unit	This unit applies to the interpretation of cooling phase diagrams as used in metallurgy. The application will primarily be to phase diagrams of metals and alloys showing temperature and composition variables. In a typical scenario, a metallurgical technician will be required to recommend a phase transition process in order to obtain a required microstructure, or to predict a microstructure from a known phase transition process.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify the microstructures from an equilibrium cooling phase diagram	1.1. Phase diagram for metal or alloy is obtained from internal or external sources 1.2. Identify number, composition, proportion and structural arrangement of phases in binary alloys. 1.3. Describe structural changes due to varying proportion of alloying elements and temperature. 1.4. Describe the phase changes and final microstructures of binary alloys cooled under equilibrium conditions from the melt or during heat treatment operations.
2. Identify the microstructures from a non equilibrium cooling phase diagram	2.1. Identify number, composition, proportion and structural arrangement of phases in binary alloys. 2.2. Describe structural changes due to varying proportion of alloying elements and temperature. 2.3. Describe the phase changes and final microstructures of binary alloys cooled under equilibrium conditions from the melt or during heat treatment operations.
3. Recognise characteristic microstructures of binary alloys	3.1. .Recognise characteristic structures of dendrites (homogeneous and cored) columnar and equiaxed grains. 3.2. Recognise characteristic structures resulting from eutectic, eutectoid and peritectic reactions. 3.3. Recognise characteristic structures resulting from solid state precipitation.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• produce a basic cooling phase diagram from supplied data • estimate composition from the structure of a phase diagram • predict structure from the composition from a phase diagram
Required knowledge:
Competency includes sufficient knowledge of: • methods of construction of phase diagrams for binary alloys. • the phase changes that occur in binary alloy systems as recorded by the appropriate phase diagrams. • the equilibrium and non equilibrium cooling of binary alloys and the resulting microstructures in cast and heat treated material.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	The person will be able to interpret binary phase diagrams. Assessment may be by workplace project, case study or suitable alternative.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • recognise and use correct scientific terminology in regards to phase diagrams • source phase diagrams and other reference material from internal or external sources • use phase diagrams to interpret intermediate and final phase structures of binary alloys
Relationship to other units	This unit may be assessed concurrently with other relevant units.

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EVIDENCE GUIDE	
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Scientific techniques and principles of cooling phase diagrams relate to	• Equilibrium phase diagrams • Non-equilibrium phase diagrams • Effect of temperature and alloying elements on structural changes • Structures of homogenous and cored dendrites • Structures of columnar and equiaxed grains • Eutectic, eutectoid and peritectic reactions

Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM305A Demonstrate basic knowledge of casting operations

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit describes the skills to discuss basic job requirements with a tradesperson, members of a team, production manager or customer

Application of the Unit

Application of the unit	This unit covers a basic understanding of the principles and commercial metal casting practices. The unit will enable a person to be able to safely access areas of a metal casting business and to identify and explain casting processes. The unit is suitable as a VET in Schools unit and for introductory training in metallurgy where the person does not have any prior casting work experience. All work is carried out under supervision and in consultation with others.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Demonstrate basic knowledge of casting processes	1.1. Identify the major areas and activities of foundry work including melting, casting, heat treatment, pattern and mould making, finishing and despatch 1.2. Identify the major items of equipment and their purpose in each foundry area 1.3. Describe the most common metals and alloys used in casting processes 1.4. Describe in the correct order the flow of metal through the foundry
2. Demonstrate knowledge of foundry terminology	2.1. Correct names are used for foundry processes and equipment 2.2. Metals and alloys are properly identified including their chemical composition
3. Identify basic understanding of commercial aspects of foundry operations	3.1. Major advantages and disadvantages of casting over other metal manufacturing processes are identified 3.2. Key cost factors are identified including energy, material, labour 3.3. A basic understanding of OHS and environmental obligations of foundries is demonstrated

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE

Required skills:

- Explain basic metal casting processes
- Identify basic items of casting equipment
- Identify product flow through a foundry or other casting operation
- Analyse mould materials and casting processes
- Identify casting defects
- Identify and control hazards

Required knowledge:

Competency includes sufficient knowledge of:

- Classification of casting processes
  - Sand casting, investment casting, die casting, lost foam, vacuum process and protective atmospheres, ingot casting
- Preparation of a mould
  - types of mould, shell moulds, dies
  - pattern types, materials, construction, design
  - raw materials: sand, bonds, other additives
  - sand moulding processes, manual moulding, machine moulding
  - moulding equipment, machines and applications, safety around machinery
  - cores, basic coremaking procedures, equipment&machines
  - mould assembly and handling
  - ancillary equipment, sand handling, mould handling and processing
- Preparation of molten alloys
  - ferrous alloys
  - cast irons, white, grey, malleable and SG cast irons
  - cast steels, carbon steels and alloy steels
  - non-ferrous alloys
  - cast aluminium alloys
  - Al-Si alloys
  - cast copper, magnesium, titanium and zinc alloys
- Melting
  - type of furnaces with applications
  - electric-arc furnace, induction furnace
  - structure and melting principles
- Pouring
  - pouring and molten metal safety
  - pouring equipment

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REQUIRED SKILLS AND KNOWLEDGE
• running and gating systems • solidification process (including grain growth, effects of super heat, mould geometry, chill) • feeding: risers outline of basic principles • Cleaning of castings • shakeout • cleaning room practices: methods and equipment • removing the mould materials • removing gate and risers • finish cleaning • Inspection of castings • visual examination • magnetic, penetrant methods, • radiographic, ultrasonic methods • chemical, metallographic, mechanical testing • Repair of casting • aligning, welding, filling

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to demonstrate basic knowledge of casting operations. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • Correctly identify casting processes and equipment • Demonstrate knowledge of casting principles and practices. Evidence should be provided that knowledge can be applied to a number of castings

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EVIDENCE GUIDE	
	using different alloys and or different moulds.
Relationship to other units	This unit may be assessed concurrently with other relevant metallurgy units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an organisation where casting is done. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present

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RANGE STATEMENT	
with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes or practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Casting processes	Includes melting, pouring, casting, patternmaking, mould preparation including sand moulds, dies, metal moulds, lost wax and lost foam casting, heat treatment, finishing, despatch and testing
Equipment	Includes equipment associated with the processes listed above

Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM401A Prepare and examine metallographic samples

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers the knowledge and skills needed to prepare and examine a metallographic sample.

Application of the Unit

Application of the unit	In a typical scenario, a metallurgical technician will be required to examine samples as part of quality control, product development or problem solving/forensic investigation. This unit covers the preparation of relevant samples and then the microscopic and other examination of such samples.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MSATCM304A*	*Interpret basic binary phase diagrams*

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare chemical etchants for use with metallographic samples	1.1. Identify the hazards of the required chemical etchants and apply hazard controls 1.2. Prepare etchant solution from bulk stocks following hazard controls and good laboratory practice 1.3. Label and store etchants to standard 1.4. Standardise/check etchants as required by procedures.
2. Prepare sample for metallographic examination	2.1. Undertake mechanical sample preparation 2.2. Label/identify sample to procedure 2.3. Select etchant(s) appropriate to the metal and the examination 2.4. Etch/prepare metal surface to standard 2.5. Protect prepared surface
3. Undertake microscopic examination of sample.	3.1. Set up microscope using appropriate fittings and magnifications 3.2. Examine and identify different metallic and non-metallic phases 3.3. Identify areas requiring further examination and/or photomicrographs .
4. Prepare photomicrographs	4.1. Set up equipment and materials for photomicrograph 4.2. Adjust photomicrograph equipment, including bright and dark field illumination 4.3. Take photomicrograph 4.4. Process and record photomicrograph
5. Report result of examination	5.1. Identify reporting requirements

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ELEMENT	PERFORMANCE CRITERIA
	5.2. Make reference to appropriate national or international standards as required 5.3. Prepare report to meet requirements 5.4. Circulate and file report to procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• nominating the appropriate cutting process • nominating the appropriate directionality of the sample plane for examination • mixing/preparing etchant solutions according to MSDS and standard operating procedure (SOP) • mixing/preparing mounting resins • basic cutting, grinding and polishing of samples including mechanical and electrolytic polishing • etching of samples • use of microscope • identify microstructures, including metallic and non-metallic features
Required knowledge:
Competency includes sufficient knowledge of: • understanding of microstructures of metals • chemical applications and safety including material safety data sheets (MSDS) • composition and suitability of etchants • knowledge of relevant standards (for example AS 1831 or equivalent international standard)

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training

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EVIDENCE GUIDE	
Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare and examine metallographic samples. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • Prepare and examine samples. Evidence should be provided from a number of sample preparations and examinations, covering the use of different etchants, preparation methods and examinations. The reports prepared should be a major part of this evidence, but will need supplementing to demonstrate the validity of this evidence.
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an organisation where metallographic sample preparation and examination is undertaken. A bank of

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EVIDENCE GUIDE	
	case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Hazards	Hazards to be identified by standard techniques such as Material Safety Data Sheets (MSDS) and controlled according to the hierarchy of control and SOP.
Etchants	Etchants includes all common etchants such as strong acid solutions.
Metallographic examination	**Metallographic examination includes microscopy**, **photomicrographs and other standard techniques**.
Mechanical sample preparation	Mechanical sample preparation includes cutting (eg to size/shape), mounting, grinding (e.g. to prepare flat surface) and polishing (e.g. on a lap) as required.
Process and record	Processing and recording of photomicrographs includes editing and enhancing of photographs and identification and filing using an appropriate procedure.

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Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM402A Monitor and test sands, cores and moulds

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers the knowledge and skills needed to analyse ***mould*/*core*** performance in terms of their design and sands used.

Application of the Unit

Application of the unit	In a typical scenario, a technician will be required to draw conclusions as to the appropriateness of mould/core design and sand type chosen, and make recommendations as to design of mould/cores and selection of sands.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Control hazards	1.1. Identify hazards in the sand/mould/core making process 1.2. Assess the risks arising from those hazards 1.3. Implement procedures to control those hazards in line with procedures and duty of care.
2. Select appropriate sand characteristics for job and process	2.1. Determine requirements of the casting 2.2. Identify types of sand appropriate for the type of mould/core 2.3. Identify types of binders appropriate for the job 2.4. Select sand/binder mix appropriate for the job
3. Prepare, test and evaluate moulding sand to desired characteristics	3.1.. Monitor preparation of bonded sand mix 3.2. Test materials prepared 3.3. Evaluate test results and report as appropriate
4. Evaluate finished casting for defects related to sand characteristics.	4.1. Examine casting for sand related defects such as wash, expansion, scabbing, rat-tails etc. 4.2. Determine cause of sand related defects 4.3. Recommend improvements to sand type and/or preparation
5. Report results	5.1. Identify reporting requirements 5.2. Prepare report to meet requirements 5.3. Circulate and file report to procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• take samples • prepare standard samples • use test equipment • use and calibrate mixing machines
Required knowledge:

Competency includes sufficient knowledge of:
• Sources of sands and their characteristics
• green sand, resin and silicate bond moulds , shell moulds
• relationship of moulding sand properties and characteristics to casting defects.
• expansion, scabbing, rat-tails, hardness.
• sand grain shape and distribution, permeability, gas evolution, blow holes.
• mould properties, green strength, shatter.
• refractoriness
• mould dilation
• definition of clay bonded sand
• testing clay bonded sand
• A.F.S. standard compression sample
• moisture content
• clay content
• green compression
• green permeability
• mould hardness
• shatter index
• sieve analysis
• loss of ignition (LOI)
• A.F.S. fineness number
• other tests as appropriate
• organic and inorganic bonded and core sands
  • drying oils: stoving, characteristics
  • cold setting oils: characteristics
  • synthetic resins, characteristics and applications
  • shell moulding
  • sodium silicate binders, characteristics
  • phenolic urethanes

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REQUIRED SKILLS AND KNOWLEDGE
• furfuryl alcohol • phenolic esters • alkaline phenolics • testing hardened sands: tensile • compression hardness • choice of binder.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to monitor and test sands, cores and moulds. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • Prepare and test sand samples • Monitor and interpret results • Apply corrections to the sand system as dictated by the sand testing results • Relate sand-related casting defects to sand properties and recommend corrective actions
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct

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EVIDENCE GUIDE	
	observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an organisation using sand casting. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Hazards	Hazards to be identified by standard techniques such as Material Safety Data Sheets (MSDS) and controlled according to the hierarchy of control.
Mould/core	Mould/core means sand mould/core

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RANGE STATEMENT	
Bonded	Bonding materials for sand include clay, organic and inorganic binders

Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM403A Evaluate mould design and gating

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers the knowledge and skills needed to evaluate mould design, gating, running and feeding of castings (known as methoding) including understanding the solidification process and techniques to eliminate defects to meet specified quality requirements.

Application of the Unit

Application of the unit	In a typical scenario, a metallurgical technician will be required to examine a mould design and draw some conclusions as to the appropriateness of gating, running and feeding design, or alternatively make some recommendations as to design.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MSATCM304A*	*Interpret basic binary phase diagrams*
	MSATCM305A	*Demonstrate basic knowledge of casting operations*

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify specification requirements for required casting	1.1. Obtain all relevant job requirements and design specifications in accordance with workplace procedures 1.2. Identify and interpret drawing requirements and specifications
2. Evaluate proposed mould design for causes of potential defects	2.1. Select running, gating and feeding principles and techniques relevant to the particular casting 2.2. Apply relevant scientific principles and techniques appropriately 2.3. Review placement and sizing of feeder heads 2.4. Calculate the size and number of feeder heads and gating for castings
3. Report results	3.1. Identify reporting requirements 3.2. Prepare report to meet requirements 3.3. Circulate and file report to procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• Apply scientific principles to foundry mould design • Evaluate mould design to suit specific applications • Calculate mould runner and feeding systems • Select appropriate techniques and associated software and hardware technologies to suit

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REQUIRED SKILLS AND KNOWLEDGE
specific applications in foundry mould design • Present solutions and any associated limitations referring to the original aim of the application.
Required knowledge:

• Solidification
  • Nucleation
  • Growth mechanisms (crystal and interfacial)
  • Dendrite coherency
  • Constitutional undercooling
  • Superheat
  • Eutectic and peritectic solidification
  • Grain Structure
• Running, Gating and Feeding
  • Terminology
  • Runner and gating principles (ratios)
  • Pouring basin or cup
  • Sprue design
  • Runner design
  • Ingate design
  • Inclusion control (slag, erosion, etc)
  • Metal flow (lamellar and turbulent), velocity and temperature
  • Modulus principle (calculation of feeder size)
  • Location of feeders (end and feed zones, neighbourhood effect, feeding distances)
  • Exothermic and insulating feeding aids (sleeves and topping)
  • Feeding mechanisms (liquid, mass, interdendritic, burst&solid)
  • Computer packages (runner and feeder calculations, mould simulations)
  • Yield calculations
• Defect Formation
  • Shrinkage
  • Porosity
  • Segregation
  • Hot Tearing
  • Shear

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to evaluate mould design and gating. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • Calculate manually and by use of computer programs runner and feeding systems for casting designs. Evidence must be provided of manual calculations and compared to computer program results. • Evaluate mould designs. Evidence should be provided from the evaluation of a number of moulds. • Understand the interplay between moulds, cores, gating and feeding • Evaluate the resulting casting for success of gating and feeding • Compare casting results with computer simulated predictions.
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit.

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EVIDENCE GUIDE	
	The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Size and number of feeder heads and gating	Calculation of the size of feeder heads and gating includes manual calculation and use of computer programs

Unit Sector(s)

Unit Sector	Metallurgy

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Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM404A Undertake and interpret results of chemical analysis on metal samples

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This competency covers the selection of the appropriate chemical instrumentation test method and the interpretation of the test results in the context of a foundry. It also includes the conducting of optical emission spectroscopy (OES) testing, but not the conducting of any other tests.

Application of the Unit

Application of the unit	This competency applies to technicians working in or advising foundries who are required to decide what test data is needed and then interpret the test results so they can make adjustments as necessary to the foundry process. It includes: • knowing what data is needed • selecting the test method(s) which will give that data • interpreting the test results • advising adjustments to the foundry process, materials, compositions based on the test results • actually undertaking optical emission spectroscopy OES (but no other) testing as required.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

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Pre-requisite Units		

Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Organise required test(s).	1.1. Identify information and test data required. 1.2. Select appropriate test(s) which will yield the required data. 1.3. Determine the capacity to undertake required test(s). 1.4. Confirm capacity to undertake test(s) with selected body. 1.5. Make required arrangements for testing to be carried our.
2. Undertake optical emission spectroscopy as required.	2.1. Prepare sample as required by test method. 2.2. Prepare instrument as required by procedures. 2.3. Test sample 2.4. Record and check test results 2.5. Repeat test results as required.
3. Interpret test results.	3.1. Check test results are within the expected range and take appropriate action for non-conforming results. 3.2. Perform any required calculations or data manipulations.

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ELEMENT	PERFORMANCE CRITERIA
	3.3. Determine implications of test results for process/product. 3.4. Develop actions to be taken based on test results.
4. Implement actions	4.1. Communicate required actions as required. 4.2. Follow through on communication to check implementation. 4.3. Check results of actions. 4.4. Follow up as required.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• identify relevant spectra. • communicate both with other technicians and also with shop floor operatives about technical matters • Write technical reports and production specifications • understand and interpret numeric data as well as manipulate test data in order to obtain the required information • calculate concentrations and dilutions The mathematics relevant to the manipulation and interpretation of test data is also required. A knowledge of the impact of chemical composition on the foundry process and product and what adjustments should be made, and how they can be made is also required.
Required knowledge:
Competence in this unit requires knowledge of the principles of operation, uses and limitations of: • Optical Emission Spectroscopy (OES) (otherwise known as Atomic Emission Spectroscopy (AES)) • UV - Visible Spectrophotometry (UV Vis) • Infrared Spectroscopy (IR) • Gas Chromatography (GC) • X-Ray Fluorescence (XRF) • Flame Photometry • Atomic Absorption Spectrometry (AAS)

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REQUIRED SKILLS AND KNOWLEDGE
• Scanning Electron Microscopy (SEM) • Traditional Wet Analysis

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	This competency requires evidence of competent operation of OES which may be obtained either in a workplace or other suitable laboratory facility. The materials being tested should be relevant to the foundry industry. This competency also requires evidence of competency in the selection of appropriate test methods for various scenarios and the interpretation of test results. The scenarios and test results should be relevant to the foundry industry and may be drawn directly from the workplace or may be simulated case studies.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • select appropriate test methods • obtain repeatable OES results • interpret test results for a foundry. Consistent performance should be demonstrated. In particular look to see that: • several scenarios requiring the selection of different test instruments have been completed successfully • reproducible test results can be obtained from OES testing across different samples requiring different sample preparation/test conditions.
Relationship to other units	This unit may be assessed concurrently with other relevant units.

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EVIDENCE GUIDE	
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. A holistic approach should be taken to the assessment. Competence in this unit may be assessed: • in a foundry • in another suitable laboratory facility, using simulation for non OES evidence • by use of a suitable simulation and/or a range of case studies/scenarios • by a combination of these techniques. In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of	Where reference is made to industry codes of practice, and/or

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RANGE STATEMENT	
practice/standards	Australian/international standards, it is expected the latest version will be used.
Context	This competency applies to metallurgical technicians working in a foundry who are responsible for determining the chemical composition of materials, products and work in progress and making recommendations as to what needs to be done to produce the required product. The technician may undertake some sampling and testing themselves, and will also specify the sample requirements to be taken by an operator. The technician will be responsible for outsourcing required tests where the foundry does not have the test instrument or capability. The technician will be responsible to interpret the test results regardless of where the test is done and determine what needs to be done to make the required product.
Procedures	All operations are performed in accordance with procedures. Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include: • ISO standards • ANZS • NATA requirements • Other relevant standards.
Tools and equipment	This unit of competency includes use of equipment and tools such as: • routine laboratory equipment such as glassware • sampling equipment used in foundries • emission spectroscopy equipment.
Test data	Test data includes: • composition and other quantitative data • component identification and other qualitative data.
Appropriate test(s)	Appropriate tests include: • Optical Emission Spectroscopy (OES) • UV - Visible Spectrophotometry (UV Vis) • Infrared Spectroscopy (IR) • Gas Chromatography (GC) • X-Ray Fluorescence (XRF) • Flame Photometry • Atomic Absorption Spectrometry (AAS)

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RANGE STATEMENT	
	• Scanning Electron Microscopy (SEM).
Capacity	Capacity to undertake tests include: • possession of the appropriate test instrumentation • possession of the appropriate trained people with the available time • NATA registration if relevant • cost, turn around time and other relevant commercial factors • required infrastructure to undertake the test(s). Capacity applies both to in house and out sourced test facilities.
Body	Selected body to undertake the test incudes: • university • TAFE college • commercial analytical firm • NATA approved facility • in house facility and personnel.
Required arrangements	Required arrangements include: • obtaining, labelling and transporting sample • contractual/work order or other requirements.
Prepare sample	Prepare sample includes: • taking representative sub samples • sample dissolution • sample dilution • readying the sample for the test.
Prepare instrument	Prepare instrument includes: • calibrating or checking calibration as appropriate • checking the adequacy of the supply of consumables • curve generation • setting machine conditions • checking machine function.
Actions	Actions to be taken include: • adjusting process conditions and set points • specifying additives and combinations of additives • adjusting processing times.

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Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM405A Determine and supervise heat treatment of metal

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers applying metallurgical principles and techniques to determine and supervise the heat treatment of metal.

Application of the Unit

Application of the unit	This unit requires application of metallurgical scientific principles and techniques as a member of a design and development team or similar in support of enhancing properties of metals though heat treatment.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MSATCM304A*	*Interpret basic binary phase diagrams*
	MEM06003C	*Carry out heat treatment*

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine heat treatment of metals to suit application requirements	1.1. Consultations and briefings are undertaken with managers, employers and customers and other sources of information researched as appropriate to determine heat treatment application requirements 1.2. The relevant scientific techniques and principles of heat treatment and associated software and hardware technologies are selected for particular application 1.3. Appropriate calculations and coherent units are used in the solution of engineering calculations 1.4. Significant figures are used in engineering calculations. 1.5. Heat treatment requirements
2. Supervise heat treatment of metal	2.1. Heat treatment parameters are communicated to appropriate personnel 2.2. Safety procedures appropriate to heat treatment process and item to be treated are determined and implemented 2.3. Supervise heat treatment techniques and use of associated software and hardware technologies to ensure required heat treatment solutions is achieved 2.4. Evaluate heat treatment process and advise on defects

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• select appropriate scientific principles to suit specific heat treatment applications

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REQUIRED SKILLS AND KNOWLEDGE
• select appropriate techniques and associated software and hardware technologies, to suit specific applications in heat treatment • apply and manipulate appropriate formulas for heat treatment applications involving engineering calculations • apply appropriate calculations to engineering situations • refer solutions to the original aim of the application. • quote solutions for the application in appropriate units, using appropriate significant figures. • quote limitations of solutions for the application, due to assumptions, scientific principles and techniques used • present solutions for the application referring to the original aim of the application including elimination or containment of risks and establishing of safety procedures
Required knowledge:
Competency includes sufficient knowledge of: • heat treatment principles as given in the range statement • limitations of selected scientific principles • risks and safety procedures appropriate to heat treatment of metals and alloys

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to determine and supervise heat treatment of metal. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • Select the appropriate heat treatment cycle(s) for nominated materials, so that they meet the required physical properties.
Relationship to other units	This unit could be assessed in conjunction with any other units addressing the safety, quality,

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EVIDENCE GUIDE	
	communication, materials handling, recording and reporting associated with applying basic scientific principles and techniques in mechanical engineering situations or other units requiring the exercise of the skills and knowledge covered by this unit.
Assessment method and context	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to a situation where heat treatment of metal is undertaken. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other

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EVIDENCE GUIDE	
	special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Sources of information	• reference texts • manufacturers' catalogues and industrial magazines • websites • use of phone, email and fax information gathering
Scientific techniques and principles of heat treatment relate to:	Ferrous heat treatment • the iron-carbon equilibrium and plain carbon steels. • iron-carbon phase equilibrium • austenite-ferrite transformation • austenite-pearlite steels • influence of grain size and carbide distribution on mechanical properties. • microstructure and properties of slowly cooled steels. • effect of temperature and composition on structure and properties. • effects of alloying elements in iron-carbon alloys. • the gamma and sigma phase fields • distribution of alloying elements in steel. • effects of alloying elements in the kinetics of gamma and sigma transformations. • structural changes resulting for alloying additions. • transformation diagrams for alloy steels. • isothermal transformation of austenite. • austenite grain size • formation of pearlite

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RANGE STATEMENT	
	• formation of bainite • role of alloying elements • mechanical properties of pearlite and bainite • Temperature Time Transformation (TTT) diagrams. • quenching treatments. • formation of martensite • morphology and crystallography of ferrous martensites • mechanical properties of martensites • retained austenite • quenching media - stages of quenching, effect of variables • thermal and transformation stresses, quenching defects. • transformation of austenite continuous cooling • cooling curves • Continuous Cooling Transformation (CCT) diagrams • hardening and heat treatment. • factors affecting how well a metal responds to hardening processes • use of TTT and CCT diagrams • hardenability testing e.g. Jominy • hardenability and heat treatment • tempering • tempering of irons and steels. • tempering of non ferrous metals and alloys • mechanical properties of tempered irons and steels • mechanical properties of non ferrous metals and alloys
Special heat treatments	• austempering • martempering (marquenching) • maraging steels • high-strength, low-alloy (HSLA) steels. • surface treatments • carburising • carbonitriding • nitriding • induction and flame hardening • other methods • heat treatment defects • nature and prevention of defects

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RANGE STATEMENT	
	• surface • structural and property • stress related • dimensional • embrittlement
Non-ferrous heat treatments	• aluminium alloys • solutions treatments • quenching • precipitation hardening • coldworking • temper designations • copper alloys • solution annealing • age hardening • precipitation hardening • coldworking • quenching and tempering • miscellaneous non-ferrous
Significant figures	Are those relevant to accuracy and are appropriate to the process, data and desired range of results
Risks and safety procedures	• biological factors in quench tank fluids • carcinogenic oil fumes, • flash point of oils and risk of fire in oil quenching • inert atmospheres and their potential to cause asphyxiation • specification and use of personal protective equipment (PPE) • location of emergency switches • tagging and isolation procedures • atmosphere control • identification of high risk alloys and metals • appropriate transfer times to quench and from quench to temper furnace

Unit Sector(s)

Unit Sector	Metallurgy

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Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM406A Apply basic chemical principles to metallurgy

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This competency provides basic underpinning chemistry knowledge for industrial metallurgical processes.

Application of the Unit

Application of the unit	This competency applies to metallurgists working in industrial environments including foundries, steel plants, smelters, die casting, fabrication, welding etc. The unit provides the general chemical knowledge for basic metallurgy operations. **Note**: This unit covers some but not all of the content in Year 12 chemistry subjects such as the NSW Chemistry Stage 6 syllabus and equivalents in other States and Territories. Students who have completed these chemistry subjects at school should be given the opportunity for recognition of prior learning (RPL).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

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Pre-requisite Units	

Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Demonstrate knowledge of basic chemical concepts relevant to metallurgical processes	1.1. The structure of atoms is described including sub-atomic particles, charge, atomic number, mass number, and valency . 1.2. The properties of elements is determined from the periodic table of elements. 1.3. The three states of matter are described in terms of shape, volume, and compression. 1.4. Boyles and Charles laws are used to determine the relationship between volume, temperature, and pressure for a gas. 1.5. Elements, compounds and mixtures are defined and examples given 1.6. Chemical formulae are used 1.7. The difference between organic and inorganic compounds is described 1.8. Ionic, covalent, and metallic bonding are described. 1.9. The relationship between temperature and the kinetic energy of particles is identified 1.10. The concepts of latent and sensible heat are described.
2. Contrast the physical properties of crystalline solids.	2.1. Solids are categorised from their physical properties

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ELEMENT	PERFORMANCE CRITERIA
	2.2. The physical properties of crystalline solids are related to the nature of the forces between particles.
3. Define the key chemical properties of metals.	3.1. The activity of metals and other key properties are described in terms of their position on the Periodic Table. 3.2. The importance of first ionisation energy in determining the relative reactivity of metals is described. 3.3.
4. Define the key chemical properties of acids and bases.	4.1. Definitions of acids and bases are described. 4.2. The pH scale is described and applied 4.3. The relationship between an acid and its conjugate base and a base and its conjugate acid is described 4.4. A range of salts which form acidic, basic or neutral solutions are identified and their acidic, neutral or basic nature explained 4.5. Strong and weak acids and bases are defined and identified. 4.6.
5. Analyse chemical reactions	5.1. Chemical reactions are described using appropriate balanced chemical equations 5.2. Chemical reactions between elements and compounds are explained in terms of atomic structures and periodicity 5.3. The heat of reaction in chemical reactions is determined. 5.4. Factors affecting reaction rate are explained including concentration, surface area, pressure, temperature and catalysis 5.5. The stoichiometry of a reaction is used to determine amounts of reactants consumed/products made

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• write chemical formulae • write and balance chemical equations • calculate heat of reaction
Required knowledge:
Competence in this unit requires knowledge of: • Kinetic Theory; • Boyles Law, Charles Law, • Ideal Gas equation PV=nRT, • molar volume of a gas; • Gay-Lussac's Law, Avogadro's Law; • gas reaction calculations • symbols of common elements • importance of valence in formulae and reactions • model of an atom including electron shells. • The chemical basis of energy transformations in chemical reactions • Periodic table • Acids and Bases, • Stoichiometry

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	This competency also requires evidence of competency in the description of chemical laws, principles and terminology. The application of the chemical laws and principles to a selection of appropriate scenarios should also be required. The scenarios may be drawn directly from the workplace or may be simulated case studies.

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • describe elements and compounds according to their chemical properties • use recognised and appropriate chemical symbols and terminology Consistent performance should be demonstrated. In particular look to see that: • a wide variety of elements and compounds can be described • the application of chemical laws and reactions to non laboratory situations can be explained
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. The unit is suitable for assessment in conjunction with other metallurgy units and a holistic approach should be taken to the assessment wherever possible. Competence in this unit may be assessed: • in a workplace • in a suitable laboratory facility, • by use of a suitable simulation and/or a range of case studies/scenarios • by a combination of these techniques.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. No special resources are required. However resources may be required where holistic assessment with other units is undertaken including suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Context	This competency applies to metallurgical technicians who are responsible for determining the chemical composition of materials, products and work in progress and making recommendations as to what needs to be done to produce the required product. The unit is intended to complement other more specific metallurgy units by providing general chemical knowledge.
Physical properties of crystalline solids	Crystalline solids include molecular, metallic, ionic, extended covalent solids. Physical properties include but are not limited to - boiling point, melting point, solubility in polar and/or non-polar solvents, conductivity, ductility, brittleness, hardness.
Key properties	The key properties of metals in terms of their position on the Periodic Table are: • electrical conductivity • ionisation energy • atomic radius • melting point • boiling point • combining power (valency) • electronegativity • reactivity
Use of formulae	Formulae will be correctly written for given compounds and correct names will be written from given formulae
Definitions of acids and bases	• Arrhenius definition • BrÃ¸nsted-Lowry definition
Strong Acid	Strong acids are those that have high degrees of dissociation

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RANGE STATEMENT	
	yielding hydrogen ions
Weak acids	Weak acids have partial dissociation of hydrogen ions and exist mostly in the associated form.
Strong bases	Strong bases completely or almost completely dissociate into hydroxide ions and a conjugate acid.
Weak bases	Weak bases partially dissociate into hydroxide ions and a conjugate acid.
Stoichiometry	The calculation of the quantities of chemical elements or compounds involved in a chemical reaction.

Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units	

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MSATCM501A Calculate and predict chemical outcomes in metallurgical situations

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers applying appropriate chemical principles and techniques to calculate and predict outcomes in metallurgical situations.

Application of the Unit

Application of the unit	This unit requires application of chemical principles and techniques as a member of a team or as an individual in metallurgical situations.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MSATCM406A*	*Apply basic chemistry principles to metallurgy*

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Select chemical techniques and principles relevant to ***metallurgy***	1.1. Consultations and briefings are undertaken with managers, employers and customers and other sources of information researched as appropriate to determine situation requiring metallurgical analysis 1.2. Relevant chemical techniques and principles are selected for particular metallurgical situation. 1.3. Technologies associated with chemical techniques relevant to the particular metallurgical situation are selected
2. Apply the relevant chemical principles and techniques appropriately	2.1. The basic chemical principles are applied in a consistent and appropriate manner to obtain required solutions. 2.2. Appropriate calculations and coherent units are used in the solution of chemical calculations. 2.3. Significant figures are used in chemical calculations. 2.4. The chemical techniques and associated technologies, are applied in a consistent and appropriate manner to obtain required solutions. 2.5. Solutions are communicated to appropriate personnel and situations and solutions recorded in accordance with procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:

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REQUIRED SKILLS AND KNOWLEDGE
• select appropriate chemical principles to suit specific applications • select appropriate basic mechanical techniques and associated technologies, software and hardware to suit specific applications • apply basic chemical principles to particular engineering situations • apply and manipulate appropriate formulas for applications involving engineering calculations • apply appropriate calculations to engineering and metallurgical situations • refer solutions to the original aim of the application • quote solutions in appropriate units, using appropriate significant figures. • quote limitations of solutions, due to assumptions, chemical principles and techniques used • present solutions referring to the original aim of the application.
Required knowledge:
Competency includes sufficient knowledge of: • basic chemical principles as described in the range statement • limitations of selected chemical principles

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to calculate and predict chemical outcomes in metallurgical situations. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • Apply the appropriate chemical theory to a given situation, leading to an appropriate solution.
Relationship to other units	This unit may be assessed concurrently with other relevant units.

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EVIDENCE GUIDE	
Assessment method and context	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying basic scientific principles and techniques in mechanical engineering situations or other units requiring the exercise of the skills and knowledge covered by this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other

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EVIDENCE GUIDE	
	special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Metallurgy	Metallurgy covers the scientific and technical oversight of the extraction, smelting, refining, casting, heat treating, welding, forging and fabrication of metals to produce commercial metal products or to develop new alloys and processes.
Sources of information	Sources of information include reference texts, manufacturers' catalogues and industrial magazines, websites, use of phone, email and fax information gathering.
Chemical techniques and principles	The Constitution of Matter • elements, compounds, mixtures, states of • matter; • atomic structure: protons, neutrons electrons; • electron structure of atoms; • the Bohr atom The Periodic Table The Constitution of Matter • chemical bonding: ionic, covalent, metallic; • valencies of common ions and radicals; • chemical reactions: balancing equations; • molecular & ionic equations; • Avogadro's number and the mole concept; • solubility and precipitation, solution concentration;

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RANGE STATEMENT	
	• stoichiometric calculations. The Gas Laws • Kinetic Theory; • Boyles Law, Charles Law, Combined Gas • Law; • Ideal Gas equation PV=nRT, molar volume of • a gas; • Gay-Lussac's Law, Avogadro's Law; • gas reaction calculations. Oxidation and Reduction • definitions of oxidation and reduction; • half reactions; • balancing redox equations; • significance of oxidation and reduction in metallurgy Thermodynamics • First Law of Thermodynamics; • Exothermic and endothermic reactions • Heats of reaction, combustion,etc; • Hess' Law • Heat capacity, Kirchoff's Law • Acid-base theory, hydrolysis; • Ionic product for water: pH, and pOH, the pH scale • Equilibrium constant • Effect of temperature and pressure on equilibrium constant Equilibrium and Free Energy Change • Carnot cycle: concept of entropy; • Second Law of Thermodynamics; • Gibbs free energy; • Relationship between free energy and equilibrium constant; • Van't Hoff isotherm, Ban't Hoss isochore • Relationship between free energy and temperature Rates of Chemical Reactions • Factors affecting rates of reaction; • Collisions theory, activation energy; • Theory of absolute reaction times Electrochemistry • Electrolytic conduction: ionic conduction;

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RANGE STATEMENT	
	• Theories of ionisation; • Ostwalds's dilution law, Onsager equation; • Electrode potential, electrical double layer; • Redox potentials, e.m.f series; • Electrochemical cells, anodes, and cathodes (definition); • Nernst equation; • Applications of electrochemistry; • Galvanic series, Pourbaix diagrams, • Corrosion, electroplating, refining
Significant figures	Are those relevant to accuracy and are appropriate to the process, data and desired range of results

Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM502A Identify and describe equipment for mineral and chemical processing plants

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers applying scientific principles and techniques to identify and describe processing equipment in mineral and chemical processing plants from a metallurgical perspective.

Application of the Unit

Application of the unit	This unit requires application of scientific principles and techniques as a member of a design and development team or similar in support of specifying basic mineral extraction processes associated with metals production.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MSATCM304A*	*Interpret basic binary phase diagrams*
	MSATCM406A	*Apply basic chemistry principles*

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Research and identify the range of scientific principles and techniques relevant to mineral and chemical processing plants.	1.1. The scientific principles relating to mineral and chemical processing are researched and reported on from appropriate sources of information and examination of applications. 1.2. The techniques and associated technologies, software and hardware required to implement scientific principles relating to mineral and chemical proccessing plants are identified.
2. Select scientific principles and techniques relevant to *equipment inmineral and chemical proccessingplants*	2.1. Scientific techniques and principles relevant to particular mineral and chemical processing situations are selected. 2.2. Relevant techniques and associated technologies, including software and hardware, are selected for particular mineral and chemical processing situations.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• select appropriate scientific principles to suit specific mineral processing and metals production applications • apply scientific principles to particular processing situations • refer solutions to the original aim of the application. • quote solutions in appropriate units, using appropriate significant figures.

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REQUIRED SKILLS AND KNOWLEDGE
• quote limitations of solutions, due to assumptions, scientific principles and techniques used • present solutions referring to the original aim of the application
Required knowledge:

Competency includes sufficient knowledge of:
• basic scientific principles (as given in the range statement) including:
  • limitations of selected scientific principles
  • basic mineral and chemical processing techniques and technologies, including software and hardware associated with implementing scientific principles in mineral and chemical processing situations related to metals production

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to apply basic scientific principles and techniques in describing equipment for mineral and chemical processing.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • identify appropriate techniques and equipment used for mineral and chemical processing • function of each type of equipment • steps in the processing of particular minerals and chemicals including flow diagrams • identify relationship of the processing of particular minerals and chemicals to metals production
Relationship to other units	This unit may be assessed concurrently with *MCMPM518A Specify basic metal extraction processes from minerals*
Assessment method and context	Assessors must be satisfied that the person can

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EVIDENCE GUIDE	
	consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment. Assessment will need to occur in a situation where mechanical testing is undertaken.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required may include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Sources of information may include:	• reference texts, • manufacturer's catalogues • industrial and professional magazines and journals, • colleagues • websites, • phone, email and fax information gathering •
Equipment in mineral and chemical processing plants can include equipment for:	• Transport and storage of materials • Heat transfer • Solids drying • Phase dispersion and separation • Gas solid operations • Liquid liquid operations • Liquid solid operations • Solid solid operations • Size reduction and size enlargement • Bulk solid handling • Packaging of solids and liquids • Chemical reactors • Waste management • Process safety • Energy generation and utilisation •
Scientific techniques and principles include:	• Principles of mineral processing • Principles of chemical processing • Function of each type of equipment • Flow diagrams • Processes for particle size change • Processes for separation of materials • Processes for mixing of materials • Processes for chemical change •

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Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units	

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MSATCM503A Recommend a refractory for an application

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers the knowledge and skills needed to recommend a refractory for an application based on a knowledge of the properties, application and modes of failure of the ***principal refractories***.

Application of the Unit

Application of the unit	In a typical scenario, a metallurgical technician is involved with the development of a new product or process, or the improvement or redesign of an existing product/process. As part of this the requirements for an appropriate refractory material will need to be considered and a recommendation as to the type of refractory which will be appropriate for the situation will be made. This may also include evaluating suggestions made by refractory suppliers for their appropriateness to the situation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify the process requirements for a refractory	1.1. Identify the pH of the metallurgical slags 1.2. Determine the insulating requirements from the refractory 1.3. Determine other process requirements from the refractory 1.4. Identify likely process causes of refractory failure 1.5. Specify refractory needs in terms of physical and chemical properties required. 1.6.
2. Recommend type of refractory material	2.1. Select a refractory class suitable for the pH of the metallurgical slag 2.2. Shortlist refractory materials within that class suitable for the insulting and other process demands 2.3. Contrast the principal modes of failure for each short listed refractory with the likely process causes of refractory failure 2.4. Recommend suitable refractory material/s for the job. 2.5.
3. Consider economic and technical implications of different *modes of installation*	3.1.. Compare possible alternative refractory materials 3.2. Compare possible alternative installation methods 3.3. Consider alternative materials with different installation methods and their overall technical/economic performance 3.4. Recommend a refractory material and a method of installation which delivers the best economic and

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ELEMENT	PERFORMANCE CRITERIA
	technical performance for the application. 3.5.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• Apply principles to determine the pH of metallurgical slags • Select appropriate refractories for an application • Select appropriate method of refractory installation and repair • Identify root causes of refractory failures
Required knowledge:
Competency includes sufficient knowledge of: • metals and their properties and operating temperatures • furnace operations • refractory materials, purposes, common defects, installation and fixing techniques • the limitations of refractories

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to recommend a refractory for application. Critical aspects for assessment and evidence are required to demonstrate competency in this unit. The person will be able to select appropriate materials and installation methodologies for specified

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EVIDENCE GUIDE	
	situations. Assessment may be by workplace project, case study or suitable alternative. The selection should be able to be justified on technical and economic grounds.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • identify refractory requirements for particular metals, alloys, slags and processes • recommend refractories that are appropriate from both a technical and economic perspective • determine the mode of refractory failure and recommend a more appropriate solution
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessment will need to occur in an organisation using refractory materials. Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of If evidence is provided from a complete reline, or an initial refractory lining, then one recommendation may provide sufficient evidence. Where evidence is from the ongoing maintenance of an existing refractory, then it will be needed from a range of activities to provide sufficient evidence.

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EVIDENCE GUIDE	
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an organisation using refractories that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Principal refractories	Principal refractories includes: • silica • alumino silicates • dolomite • magnesite-chrome, • chrome-magnesite • chrome • insulation and insulating refractories • special refractories (eg graphite, silicon carbide) • monolithic refractories ie cement, plastics, ramming mixes and castables • pH pH of slags to be identified as acidic, basic or neutral in regards to their interaction with refractories.
Modes of installation	Modes of installation include: • monolithic

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RANGE STATEMENT	
	• fired shape structures • bricks • other (eg sprayed)

Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM504A Select metal forming process

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This competency covers the selection of the appropriate metal forming processes for an application. It requires using metallurgical principles and techniques to select a process which is appropriate for the required product end use and the metal(s) to be used.

Application of the Unit

Application of the unit	This competency applies to technicians who are required to recommend a metal forming process for making a metal product. It includes: • knowing the principles of common forming processes and their typical applications • identifying the key factors in the product to be made which will guide the forming process selection • applying basic metallurgy to the situation so as to make an appropriate recommendation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MEM09002B*	*Interpret technical drawing*
	MSATCM501A	*Calculate and predict chemical outcomes in metallurgical situations*

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Pre-requisite Units	*MEM09002B*	*Interpret technical drawing*
	MEM30007A	*Select common engineering materials*

Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Confirm requirements	1.1. Communicate with stakeholders regarding technical and aesthetic specification 1.2. Identify process constraints such as timelines and cost 1.3. Identify any special requirements of product or process 1.4. Confirm product and process requirements with stakeholders.
2. Shortlist possible forming processes	2.1. Identify forming processes which may be appropriate. 2.2. Discuss suitability of different processes with stakeholders. 2.3. Guide stakeholders to determine relative benefits of individual processes 2.4. Clarify conflicts of information and benefits that arise.
3. Select metal forming process.	3.1. Select the most appropriate process for the application. 3.2. Explain reasons for selecting process to stakeholders. 3.3. Clarify any unresolved areas.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

- communicate technical information both with technical and non-technical stakeholders who may be customers or managers.
- write to the level of reading technical information and writing technical reports and production specifications.
- understand and interpret numeric data.

Required knowledge:

Competence in this unit requires knowledge of the principles, strengths and weaknesses and typical applications of:

- Casting Methods including greensand, chemically-bonded sand, horizontal part, vertical part, investment, gravity die, pressure die, centrifugal, direct cast;
- Powder Metallurgy including unidirectional die pressing, isotropic pressing, power rolling, power swaging, power extrusion, explosive compacting, sintering;
- Electrometallurgy including chemical and mechanical pretreatments, electroplating, cadmium plating, zinc plating, tin plating, copper plating, nickel plating, chromium plating, electropolishing;
- Methods of metalworking including plastic deformation, recrystallisation, recovery, grain growth, structural changes, property changes, direct compression, indirect compression, tensile, bending, shearing;
- Direct compression processes including forging, rolling;
- Indirect compression processes including extrusion, wire drawing, tube drawing, deep drawing
- Tensile processes including stretching
- Bending processes including cold and hot bending
- Cutting and shearing processes including turning, milling, grinding, shearing,
- Lubrication for metal forming processes including role of lubrication, types of lubricants
- Metal forming risk factors including tool and die wear, metal fatigue, tool and product heating, (can we add some more?)
- Furnaces including melting furnaces, heating furnaces, energy sources, atmospheres, refractories
- Isotropic&anisotropic materials including directional and non-directional plastic and fracture properties, texture etc;

Competence also requires the ability to identify and ask questions which will lead stakeholders to describe the key factors and properties required.

Knowledge should also include economic and timeliness factors as well as quality, aesthetics of finish and technical differences such as strength, rigidity, corrosion resistance, grain

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REQUIRED SKILLS AND KNOWLEDGE
structure, chemical composition etc.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	This competency also requires evidence of competency in the selection of appropriate processes for various scenarios. The scenarios should be relevant to the application of metallurgy to the forming process and may be drawn directly from the workplace or may be simulated case studies.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • select appropriate forming process • justify the selection of that process • ask appropriate questions to determine the required information. • Consistent performance should be demonstrated. In particular look to see that: • several scenarios requiring the selection of different processes have been completed successfully
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation

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EVIDENCE GUIDE	
	records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Context	This competency applies to metallurgical technicians working in a foundry who may be required to make a recommendation of an appropriate forming process for a metal product. The appropriate process may, or may not be one conducted in a foundry.

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Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM505A Select metal joining process

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This competency covers the selection of the appropriate metal joining processes for an application. It requires using metallurgical principles and techniques to select a process which is appropriate for the required product end use and the metal(s) to be used.

Application of the Unit

Application of the unit	This competency applies to technicians who are required to recommend a metal joining process for making a metal product. It includes: • knowing the principles of common joining processes and their typical applications • identifying the key factors in the product to be made which will guide the joining process selection • applying basic metallurgy to the situation so as to make an appropriate recommendation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MEM09002B*	*Interpret technical drawing*
	MEM30007A	*Select common engineering materials*
	MSATCM406A	*Apply basic chemistry principles to metallurgy*

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Pre-requisite Units	*MEM09002B*	*Interpret technical drawing*

Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Confirm requirements.	1.1. Communicate with stakeholders regarding technical and aesthetic specification 1.2. Identify process constraints such as timelines and cost 1.3. Identify any special requirements of product or process 1.4. Confirm product and process requirements with stakeholders.
2. Shortlist possible joining processes.	2.1. Identify joining processes which may be appropriate. 2.2. Discuss suitability of different processes with stakeholders. 2.3. Guide stakeholders to determine relative benefits of individual processes 2.4. Clarify conflicts of information and benefits that arise.
3. Select metal joining process.	3.1. Select the most appropriate process for the application. 3.2. Explain reasons for selecting process to stakeholders. 3.3. Clarify any unresolved areas.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

- identify and ask questions which will lead stakeholders to describe the key factors and properties required
- communicate technical information both with technical and non-technical stakeholders who may be customers or managers
- Write to the level of reading technical information and writing technical reports and production specifications
- understand and interpret numeric data.

Required knowledge:

Competence in this unit requires knowledge of the principles, strengths and weaknesses and typical applications of:

- Metal Joining without parent metal fusion including soldering, brazing&adhesives
- Solid phase welding&diffusion bonding including time, temperature, pressure, deformation, friction welding, explosive welding, ultrasonic welding, butterwelding
- Metal Joining - Fusion welding including heat sources, atmosphere, arc, gas, laser, electroslag, MIG and TIG welding, use of heat blankets
- Heat effects of metal joining processes including heat flow, heat affected zone, weld pool solidification etc;
- Weldability, testing, weld defects including solidification cracking, heat affected zone hot tearing, hydrogen cracking, lamellar tearing, porosity, heat treatment cracking, weld decay, stress corrosion cracking, brittle fracture, fatigue,
- Time-Temperature-Transformation TTT Curves applied to preheat, post heat and post weld heat treatment
- Welding&weldability of
  - carbon steels, low alloy steels&cast irons
  - aluminium&alloys, copper&alloys
  - stainless steels&nickel alloys
- Residual stresses in welding including causes and elimination
- Economic and timeliness factors
- Quality
- Aesthetics of finish
- Technical differences such as:
  - strength
  - rigidity
  - corrosion resistance
  - grain structure

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REQUIRED SKILLS AND KNOWLEDGE
• chemical composition

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	This competency also requires evidence of competency in the selection of appropriate processes for various scenarios. The scenarios should be relevant to the application of metallurgy to the joining process and may be drawn directly from the workplace or may be simulated case studies.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • select appropriate joining process • justify the selection of that process • ask appropriate questions to determine the required information. Consistent performance should be demonstrated. In particular look to see that: • several scenarios requiring the selection of different processes have been completed successfully
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and

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EVIDENCE GUIDE	
	colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to a situation where moulds are used. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes or practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Context	This competency applies to metallurgical technicians working in a foundry who may be required to make a recommendation of an appropriate joining process for a metal product. The appropriate process may, or may not be one conducted in a foundry.

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Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units	

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MSATCM506A Monitor blast furnace operations

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers the knowledge and skills needed to monitor and control the operation of blast iron furnace

Application of the Unit

Application of the unit	In a typical scenario, a technician will be required to utilise a SCADA system to monitor the melting of iron ores and associated materials within a blast furnace, ensuring that quantities, temperatures and all procedures are used in accordance with parameters provided and standard operating procedures.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MSATCM304A*	*Interpret basic binary phase diagrams*
	MSATCM406A	*Apply basic chemistry principles to metallurgy*
	MSATCM501A	*Calculate and predict chemical outcomes in metallurgical situations*

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Access/interrogate SCADA system	1.1. Find all relevant screens and information within SCADA system 1.2. Interpret and acknowledge messages 1.3. Input and output information as required
2. Make required changes.	2.1. Adjust production / process in response to SCADA information in accordance with procedures 2.2. Apply metallurgical principles to determine and prioritise required actions in accordance with standard operating procedures 2.3. Record adjustments and variations to specifications / schedules and report to appropriate personnel 2.4. All events outside of parameters or standard operating procedures is immediately referred to appropriate personnel for remedial action

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• Carry out all work according to OH&S practices • Read, interpret and follow information on work specifications, standard operating procedures and work instructions and other reference material • Maintain accurate records • Meet specifications for furnace output • Communicate within the workplace

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REQUIRED SKILLS AND KNOWLEDGE

- Apply techniques for Increasing Blast Furnace Productivity including:
  - blast temperature
  - blast humidity
  - blast volume
  - hydrogen injection
  - oxygen enrichment
  - top pressure
  - burden control/raw materials
  - size control

Required knowledge:

Competency includes sufficient knowledge of:

- Coal
- Proximate and ultimate analysis classification of coal for metallurgical coke
- Coke
  - coal carbonisation
  - technical aspects of coke making
  - coke model, coke manufacture
  - by-product ovens
  - sequence of battery operations
  - coke properties - caking and swelling
  - quality control tests for coke
  - (crucible swelling number and Gray-king coke type)
  - coke strength and abrasion, resistance CRS - reactivity tests.
- Other Fuels
  - blast furnace gas - uses
  - coke oven gas - uses
  - fuel oil - injection of auxiliary fuels
  - tar and pitch
- IronOre
  - mineralogical characteristics
  - sources of iron, locations of ore
  - chemical analysis - ore quality desirable, unwanted impurities
  - desirable properties for iron making
  - mining/preliminary treatment (ore beneficiation)
  - ore handling
  - blending/stacking (chevron/step stacking)
  - essential characteristics of iron ore -

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REQUIRED SKILLS AND KNOWLEDGE

- reducibility/strength size distribution -
- lump ore - direction charging
- fine ore - need for agglomeration for good permeability
- testing and quality control of iron ores for iron making resistance to fines generation
- drying handling and charging resistance to decrepitation
- low temperature reduced degradation
- (Nagoyal test) height temperature
- reducibility (Gakushin test)
- softening under load
- cohesive zone of (BF)

- Ore Agglomeration
  - Need for agglomeration, sources of fines, aims for agglomeration
- Pelletising
  - use of pelletising; size and quality of ore
  - pelletising process
  - quality control needs for pellets
  - abrasion index, RDI index
- Sintering
  - sintering process
  - proportioning of raw materials
  - size of ores, blending, moisture
  - limestone and coke
  - mixing and granulation
  - sinter characteristics, sinter quality
  - size, strength, reducibility
  - chemistry (basicity ratio)
  - quality control tests for sinter
  - sieving and sizing
  - sinter tumble test (abrasion test)
  - low temperature reduction, degradation (reduction
  - degradation index - RDI), high temperature reducibility
- Miscellaneous Raw Materials
  - Fluxes: Limestone, fluorspar, quartzite
  - manganese ore, air/tonnage oxygen, water
- Iron Blast Furnace Operations
  - general description and function of blast furnace including charged materials
  - blast furnace terminology
  - blast furnace chemistry (reduction chemistry and gaseous v's solid reduction)

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REQUIRED SKILLS AND KNOWLEDGE

- thermodynamics of iron making (physio chemical principles)
- free energy charges; Ellingham
- diagram/oxygen potential
- equilibrium/equilibrium
- constant/activity
- dependence of coke/oxygen reaction and gas composition

- Blast furnace slags
  - slag/metal reactions
  - slag formation reactions
- Construction and Design of Blast Furnaces
  - furnace construction/furnace profile layout and function of processing units associated with the blast furnace
  - charging and distribution
  - ore blending, raw material bins
  - raw material control and charges
  - furnace filling
  - use of moveable armour
  - refractories and cooling systems
    - choice of refectory materials for furnace lining
    - method of cooling/under hearth
    - cooling/stave cooling
    - campaign life determinants - link between refractories and cooling system
  - blower stations:
    - hot blast stoves, tuyeres
  - gas cleaning equipment , dust extraction
  - cast house layout
    - slag/metal
    - flow-slag disposal
  - blast furnace sensors
    - computer control
    - sensors and interpretation
    - human eye
    - tuyere/casting condition
    - thermocouples
    - hot metal
    - stoves
    - brickwork
    - tip temperature probes

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REQUIRED SKILLS AND KNOWLEDGE

- pressure tapping
- level detectors
- flow meters
- flow rate of gases/hot blast
- chemical analysis
- composition of metal slag and waste gases

- Principles of Iron Making
  - furnace filling
    - mechanism of charging and of distribution segregation effects
  - blast furnace zones of operations
    - physical movement through the furnace
    - counter current process
    - solids/gas and temperature profile five internal zones lumpy/granular zone, cohesive zone, active coke zone raceway
    - hearth and deadman
    - lumpy/granular zone-zone formation
    - cohesive zone-zone formation
    - active coke zone-zone formation
    - importance of coke properties
    - zone chemistry - effects of metal, coke, alkalis and fluxes/slag.
  - raceway
    - physical structure,
    - raceway model-factor affecting shape-blast parameters
    - combustion in raceway,
    - importance of coke additives to replace coke to improve control and production.
  - hearth and deadmen-zone formation
    - (deadman boundary residence time of coke)
    - gas/liquid flow, liquid levels
    - floating levels, floating of coke bed
    - liquid permeability
    - effect of casting rate
    - fluidity of slag and metal
    - liquid flow: effect on lining wear.
  - hot metal and slag chemistry
    - hot metal - optimisation of hot metal
    - composition control of carbon, silicon, manganese, sulphur, phoporus
  - slag - mechanism of slag formation
    - optimisation of slag chemistry

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REQUIRED SKILLS AND KNOWLEDGE
• requirements of a good slag -melting point, basicity, viscosity • ability to remove unwanted materials, (de sulphurising power) • slag volume • requirements for effective and efficient operation • importance of raw material quality and quantities • burden distribution , tuyere injectants, fuel rate • elimination of irregularities • Post Iron making Practices • reasons for post iron making productivity • control of unwanted elements • control of hot metal, composition for BOS • steelmaking and balance of exothermic reactions • de sulphurising, dephosphorisation, desiliconising • lime, magnesium, aluminium • importance of injectants and slag formers, significance of slag partitioning

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to monitor blast furnace operations. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • use OH&S practices • explain the general principles of iron making • monitor the operation of a blast furnace under direction and consistently achieve required furnace output specification
Relationship to other units	This unit may be assessed concurrently with other relevant units.

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EVIDENCE GUIDE	
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
SCADA system	System Control and Data Acquisition is a general term applied to a number of systems which automatically collect critical process data, perform required mathematical manipulations on it and then make control decisions and/or give required information to personnel for action. In the continuous manufacturing sector, the ***SCADA*** system may be integrated into other sophisticated computer control systems such as DCS (Distributed control system). Organisations may simply refer to their ***SCADA*** as the DCS or other similar term (such as the proprietary name of the computer system). SCADA systems may provide information from outside of the process, such as stock/material levels in a location. This information may all be accessed by the SCADA system and the employee using it in order to make production rate and other control decisions (either automatically or human assisted) about their own process.
Metallurgical principles relate to	• preparation and selection of raw materials • characteristics of iron ore • pelletising • sintering • iron blast furnace operations • blast furnace slags • principles of iron making • techniques for increasing blast furnace productivity

Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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Co-requisite Units		

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MSATCM507A Monitor primary steel making process

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers the knowledge and skills needed to monitor and control the operation of a Basic Oxygen Steelmaking (BOS) furnace

Application of the Unit

Application of the unit	In a typical scenario, a technician will utilise a SCADA system to monitor the processing of melting steel scrap, charging of molten iron and associated materials within the Basic Oxygen Steelmaking (BOS) furnace and on completion transfer to a ladle, ensuring that quantities, temperatures and all procedures are used in accordance with parameters provided and standard operating procedures

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MSATCM304A*	*Interpret basic binary phase diagrams*
	MSATCM406A	*Apply basic chemistry principles to metallurgy*
	MSATCM501A	*Calculate and predict chemical outcomes in metallurgical situations*

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Access/interrogate SCADA system	1.1. Find all relevant screens and information within SCADA system 1.2. Interpret and acknowledge messages 1.3. Input and output information as required
2. Make required changes.	2.1. Adjust production/process in response to SCADA information in accordance with procedures 2.2. Apply metallurgical principles to determine and prioritise required actions in accordance with standard operating procedures 2.3. Record adjustments and variations to specifications/ schedules and report to appropriate personnel 2.4. All events outside of parameters or standard operating procedures is immediately referred to appropriate personnel for remedial action

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:

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REQUIRED SKILLS AND KNOWLEDGE
• carry out all work according to OH&S practices • read, interpret and follow information on work specifications, standard operating procedures and work instructions and other reference material • maintain accurate records • meet specifications for furnace output • communicate within the workplace
Required knowledge:
Competency includes sufficient knowledge of: • plant layout of the BOS furnace, identification of the processing units • process sequence of operations • scrap charging ; hot metal composition and charging; oxygen lancing • slag formation, effect of slag / metal; gas emulsion; effect of stirring with inert gas • chemistry and thermo dynamics of process including sequence of impurity element removal • influence of lance height, slagging practice- single / double number of reblows, additions of coolant • conditions for specification to end points of carbon and temperature - importance of elements C, SI, MN, P, S; residual elements, oxygen content; temperature; type of steel • conditions for final specification from end points - control of oxygen content, alloy additions and alloy recoveries, tapping of vessel, slag removal, selection of alloys. argon bubbling and temperature control of ladles • ladle transfer • metallurgical analysis in steelmaking • importance of composition of steel properties • effects of C, SI, MN, P, S and alloys NI, CR, MO, NB, TI, V, PB • effects of residual elements- CU, SN, AL, AS • effects of gases in steels- N2, O2, H2

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to monitor primary steel making

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EVIDENCE GUIDE	
	processes. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • use OH&S practices • explain the general principles of steelmaking • monitor the operation of a BOS furnace under direction and consistently achieve required furnace output specification
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are

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EVIDENCE GUIDE	
	required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
SCADA system	System Control and Data Acquisition is a general term applied to a number of systems which automatically collect critical process data, perform required mathematical manipulations on it and then make control decisions and/or give required information to personnel for action. In the continuous manufacturing sector, the ***SCADA*** system may be integrated into other sophisticated computer control systems such as DCS (Distributed control system). Organisations may simply refer to their ***SCADA*** as the DCS or other similar term (such as the proprietary name of the computer system) SCADA systems may provide information from outside of the process, such as stock/material levels in a location. This information may all be accessed by the SCADA system and the employee using it in order to make production rate and other control decisions (either automatically or human assisted) about their own process.

Unit Sector(s)

Unit Sector	Metallurgy

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Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM508A Monitor secondary steelmaking operations

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers the knowledge and skills to monitor the production of slabs prior to rolling

Application of the Unit

Application of the unit	In a typical scenario, a technician will be required to monitor the post steelmaking processes including adjustments within the ladle and control of the continuous casting of slabs in accordance with parameters provided and standard operating procedures

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MSATCM301A*	*Test the mechanical properties of materials*
	MSATCM304A	*Interpret basic binary phase diagrams*
	MSATCM503A	*Recommend a refractory for an application*

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Produce slabs to specification	1.1. Adjust contents of ladle in accordance with procedures 1.2. Monitor continuous casting process in accordance with standard operating procedure 1.3. Apply metallurgical principles to determine and prioritise required actions in accordance with standard operating procedures 1.4. Record adjustments and variations to specifications / schedules and report to appropriate personnel 1.5. All events outside of parameters or standard operating procedures is immediately referred to appropriate personnel for remedial action

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• Carry out all work according to OH&S practices • Read, interpret and follow information on work specifications, standard operating procedures and work instructions and other reference material • Maintain accurate records • Meet specifications for furnace output • Communicate within the workplace
Required knowledge:

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REQUIRED SKILLS AND KNOWLEDGE

Competency includes sufficient knowledge of:
• post steelmaking methods employed
  • ladler stirring
  • adle heating/ladle furnace
  • degassing - vacuum, ladle, stream, circulating.
  • argon oxygen decarburation (AOD)
  • lectroslag refining, remelting (ESR)
  • vacuum melting e.g. VAR
• types of steel - ingot characteristics (rimmed, capped, killed and semi-killed)
• factors contributing to successful casting
• ingots
  • influence of pouring techniques on structures of ingots
  • pit practices
  • teeming - type of ingot moulds
• mode of solidification
  • types of ingot structure
  • control of ingot structure
  • ingot defects
• continuous casting processes
  • basic principles
  • need for concast
  • development - new technologies and facilities of continuous casting for concast
  • types of concast units - VCC, HCC, curvilinear
  • description of plant equipment and process principles ,concast operations
• metallurgical aspects
  • instrumentation - sensor quality
  • solidification/internal quality
  • defects and their origin - avoidance of defects
  • compare concast units and static ingot production

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training

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EVIDENCE GUIDE	
Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to monitor secondary steelmaking operations. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • Use OH&S practices in accordance with standard operating procedures • Explain the general principles of continuous casting • Monitor the operation of a continuous cast process under direction and consistently achieve required slab output specification
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for

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EVIDENCE GUIDE	
	appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Metallurgical principles	• Post steelmaking methods employed • Types of steel - ingot characteristics (Rimmed, capped, killed and semi-killed) • Factors contributing to successful casting • Mode of solidification • Continuous Casting Processes • Metallurgical aspects

Unit Sector(s)

Unit Sector	Metallurgy

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Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM509A Recommend ferrous and non ferrous metals or alloys for an application

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit describes the skills to recommend ferrous and non ferrous metal and alloys for an application based upon a knowledge of their metallurgical properties.

Application of the Unit

Application of the unit	This unit requires application and knowledge of metallurgical properties as a member of a design and development team or similar in support of the design and development of manufacturing applications where the final product or components are made from pure metal or alloys.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MSATCM304A*	*Interpret basic binary phase diagrams*

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify the design requirements for the material	1.1. The engineering requirement for the application is determined from specification or in consultation with others
2. Select metal or alloy for the application	2.1. Material is selected based upon the requirement and consideration of principal properties and further processing 2.2.
3. Consider economic and technical implications of different metals	3.1. Compare possible alternative materials with or without further processing 3.2. Most economic solution is recommended
4. Review final recommendation	4.1. Final recommendation is reviewed with the design team and if required with customers

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• communicate personally and in writing • write reports

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REQUIRED SKILLS AND KNOWLEDGE

- prepare basic costs and estimates
- Select appropriate metals to suit specific applications
- Apply basic metallurgical principles in preparing recommendations
- Apply and manipulate appropriate formulas for applications involving engineering calculations
- Apply appropriate calculations to engineering and metallurgical situations

Required knowledge:

Competency includes sufficient knowledge of:

- Unalloyed steels
  - iron-iron carbide phase diagram. Phases in iron carbon alloys. Slow cooling of steel, critical temperature lines. Introduction to the more common heat treatment processes including full annealing, spheroidising stress relief annealing, process annealing, normalising, hardening and tempering.
- Alloy steels
  - effect of alloying elements
  - structural changes resulting from alloy additions Phase diagrams - Fe-C-Cr. effect of alloy additions on heat treatment, austenitising temperature, time and rate of transformation, hardening and tempering.
  - Manganese steel
  - Stainless steels
    - classification
    - compositions, heat treatment, structure, properties and applications of stainless steels
    - austenitic
    - ferritic
    - duplex and super duplex ferritic-austenitic
    - martensitic
    - precipitation hardening
    - heat treatment problems - sensitisation, embrittlement, etc.
- Cast irons - classifications
  - classification - structure, carbon distribution and form.
  - factors affecting structure and properties - effect of carbon, silicon, cooling rate, etc.
- Typical cast irons
  - compositions, method of manufacture, structures, properties and applications of
  - grey cast irons
  - white cast irons
  - malleable cast irons
  - nodular (ductile) cast irons

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REQUIRED SKILLS AND KNOWLEDGE

• alloy cast irons
• austempered cast irons
• compacted graphite irons
• Copper alloys
  • commercial alloys from the following systems:
  • Cu-O, Cu-Be, Cu-Ni, Cu-Sn and Cu-Al.
  • the effects of casting, deformation, recrystallisation and ageing treatments on the structure and properties of the above alloys.
• Aluminium alloys
  • commercial alloys from the following systems:
  • Al-Si, Al-Cu, Al-Mg and Al-Mg-Si
  • the relationship between structure and properties of the above alloys.
• Other
  • Zinc alloys
  • tin alloys
  • nickel alloys
  • cobalt alloys
  • magnesium alloys
  • Titanium alloys

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to recommend ferrous and non ferrous metals or alloys for an application. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • Understand the given application and designer's expectations, to recommend the appropriate metal alloy.

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EVIDENCE GUIDE	
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present

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RANGE STATEMENT	
with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Design requirements	Includes reference to all relevant drawings, specifications, manuals and documentation in accordance with workplace procedures.
Further processing	Includes addition of alloys and heat treatment ; hardening, tempering, annealing
Materials	Covers both elemental metals and alloys including: • unalloyed steels • alloy steels • stainless steels • grey cast irons • white cast irons • malleable cast irons • nodular (ductile) cast irons • alloy cast irons • copper alloys • aluminium alloys. • zinc • tin • nickel • cobalt • magnesium • titanium

Unit Sector(s)

Unit Sector	Metallurgy

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Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM510A Apply metallurgical principles and techniques in welding and other thermal processes

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers applying metallurgical principles and techniques to welding applications

Application of the Unit

Application of the unit	This unit requires application of scientific principles and techniques as a member of a design and development team or similar in support of the design and development of welding and other thermal practices in mechanical and manufacturing applications.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MSATCM505A*	*Select metal joining process*

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Select welding or thermal process principles and techniques relevant to particular applications	1.1. Consultations and briefings are undertaken with managers, employers and customers and other sources of information researched as appropriate to determine welding application requiring metallurgical specification and analysis 1.2. Relevant welding and thermal cutting techniques, principles and associated technologies are selected for application
2. Undertake welding and thermal process analysis and specify welding or other thermal process solutions	2.1. Relevant scientific principles are applied in a consistent and appropriate manner to obtain the required welding or thermal cutting solution. 2.2. Appropriate calculations and coherent units are used in the solution of engineering calculations. 2.3. Significant figures are used in engineering calculations. 2.4. Relevant techniques and associated technologies, software and hardware are applied in a consistent and appropriate manner to obtain the required welding or thermal process solutions. 2.5. Analysis results are reported and welding or thermal process solution recommended

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:

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REQUIRED SKILLS AND KNOWLEDGE
• Select appropriate scientific principles to suit specific welding applications • Select appropriate basic mechanical techniques and associated technologies, software and hardware to suit specific applications in welding • Apply and manipulate appropriate formulas for applications involving engineering calculations • Apply appropriate calculations to engineering situations • Refer solutions to the original aim of the welding application • Quote solutions in appropriate units, using appropriate significant figures • Quote limitations of solutions, due to assumptions, scientific principles and techniques used • Present solutions referring to the original aim of the application.
Required knowledge:
Competency includes sufficient knowledge of: • Welding principles and processes as specified in the range statement, including mechanical, electrical chemical and metallurgical processes associated with welding • Limitations of scientific principles associated with welding • Other thermal processes including cutting , gouging, shaping etc.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply metallurgical principles and techniques in welding. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • select the most suitable technical and economic welding and other thermal processes for an application • present analysis results and recommendations that are relevant to the product or metallurgical

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	situation
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in

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RANGE STATEMENT	
the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Application	Application refers to any manufacturing, construction fabrication or maintenance process where welding or other thermal process is required and a metallurgical analysis and specification is required either before or after welding or other thermal process is undertaken.
Sources of information	• Reference standards and texts • Manufacturers catalogues and industrial magazines • Websites • Use of phone, email and fax for information gathering
Welding techniques and principles include	Weld defect description: • for C/Mn and low alloy steels. • shape defects: excess weld metal, overlap, undercut. • lack of fusion, penetration:incomplete root penetration, lack of root fusion, lack of interrun fusion, lack of side wall fusion. • inclusions: linear, isolated, oxides, . • gas porosity: worm hole, uniform, restart, surface. • solidification porosity: crater pipe, shrinkage porosity. • solidification cracking: hot cracking, lamellar tearing. • hydrogen heat affected zone cracking. • reheat cracking. • weldability of aluminium and its alloys: • inherent problems: hydrogen porosity, oxide, their prevention. • hot cracking: causes, alloys susceptible, alloys resistant, filler metals. • heat affected zone cracking . • welding age-hardened alloys. • welding work hardened alloys. • weldability of carbon and low steels: • the welding zones of steels: identification and microstructures, relation to the iron/iron carbide equilibrium diagram, multi-run welds. • hot cracking: carbon-manganese/sulphur ration. • cold cracking: effect of hydrogen, martensite, stress.

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RANGE STATEMENT	
	• calculation of carbon equivalents • hydrogen content of steel welds and its control. • residual stress avoidence and removal. • calculation of weld preheat temperatures. • tests for cold crack susceptibility. • weldability of stainless steels • stainless steel types. • thermal and electrical conductivity. • thermal expansion. • schaeffler and delong diagrams to predict structures. • austenitic stainless steals: ferrite/hot cracking, corrosion, carbon content/intergranular corrosion.heat affected zone precipitation , carbide stabilisers, extra low carbon stainless. • other special grades: ferritic/ austenitic, martensitic/austenitic. • weldability of cast irons. • special techniques • weldability of the nickel alloys. • filler metals, braze welding
Other thermal processes include:	Cutting, gouging, shaping or local treatment using: • oxy /acetylene • oxy/hydrogen • plasma • carbon arc
Significant figures	Are those relevant to accuracy and are appropriate to the process, data and desired range of results

Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

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Co-requisite units

Co-requisite Units		

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MSATCM511A Apply metallurgy principles and practice to determine metal forming and shaping processes

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers using metallurgy skills and knowledge required to determine metal forming and shaping processes appropriate for an application.

Application of the Unit

Application of the unit	This unit requires application of scientific principles and techniques as a member of a design and development team or similar in support developing and selecting metal forming and shaping processes.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

Employability Skills Information

Employability Skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine appropriate metal forming and shaping process to suit application requirements	1.1. Consultations and briefings are undertaken with managers, employers and customers and other sources of information researched as appropriate to metal forming and shaping determine application requirements 1.2. The relevant scientific techniques and principles of metal forming and shaping and associated software and hardware technologies are selected for particular application 1.3. Appropriate calculations and coherent units are used in the solution of engineering calculations 1.4. Significant figures are used in engineering calculations. 1.5. Metal forming and shaping requirements are determined for particular application
2. Supervise metal forming and shaping processes	2.1. Metal forming and shaping parameters are communicated to appropriate personnel 2.2. Supervise metal forming and shaping processes to ensure required solutions are achieved 2.3. Evaluate metal forming and shaping processes and advise on defects

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• select appropriate mechanical scientific principles to suit specific applications • select appropriate basic mechanical techniques and associated technologies, software and hardware to suit specific applications

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REQUIRED SKILLS AND KNOWLEDGE
• apply scientific principles to metal forming • apply and manipulating appropriate formulas for applications involving engineering calculations • applyappropriate calculations to engineering situations • refer solutions to the original aim of the application • quote solutions in appropriate units, using appropriate significant figures. • quote limitations of solutions, due to assumptions, scientific principles and techniques used • present solutions referring to the original aim of the application
Required knowledge:
Competency includes sufficient knowledge of: • metal formingand shaping principles as specified in the range statement • limitations of selected scientific principles

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply metallurgy principles and practices. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning

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EVIDENCE GUIDE	
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace.The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Sources of information	• Reference texts • Manufacturers' catalogues and industrial magazines • Websites • Use of phone, email and fax information gathering

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RANGE STATEMENT	
Scientific techniques and principles	Metal forming and shaping
Plastic deformation of metals	• Revisions of the structural nature of plastic deformation of metals • Hot and cold working and recrystallisation. • Revision of material on strength and ductility test parameters. • Yielding and associatied phenomena, analysis of the complexes of stresses present in metal deformation.
Lubrication of metal surfaces	• Types of lubrication • Analysis of metal forming lubrication conditions • Typical lubricants used
Principles and methods of Rolling	Each of these topics should include knowledge of: • the physical and mechanical principles of the deformation process • industrial practices • equipment and process design; • typical products defects, advantages and disadvantages.
Principles and methods of Forging	Each of these topics should include knowledge of: • the physical and mechanical principles of the deformation process • industrial practices • equipment and process design; • typical products defects, advantages and disadvantages.
Principles and methods of Extrusion	Each of these topics should include knowledge of: • the physical and mechanical principles of the deformation process • industrial practices • equipment and process design; • typical products defects, advantages and disadvantages.
Principles and methods of Wire Drawing	Each of these topics should include knowledge of: • the physical and mechanical principles of the deformation process • industrial practices • equipment and process design;

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RANGE STATEMENT	
	• typical products defects, advantages and disadvantages.
Principles and methods of Tube Manufacture	Each of these topics should include knowledge of: • the physical and mechanical principles of the deformation process • industrial practices • equipment and process design; • typical products defects, advantages and disadvantages.
Principles and methods of Sheet Metal forming, deep drawing and pressing	Each of these topics should include knowledge of: • the physical and mechanical principles of the deformation process • industrial practices • equipment and process design; • typical products defects, advantages and disadvantages.
Principles and methods of Powder metallurgy	Each of these topics should include knowledge of: • the physical and mechanical principles of the deformation process • industrial practices • equipment and process design; • typical products defects, advantages and disadvantages.

Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

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Co-requisite units

Co-requisite Units		

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MSATCM512A Apply metallurgy principles and practice to optimise furnace operation

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers applying metallurgical principles and practices to optimise furnace operation.

Application of the Unit

Application of the unit	This unit requires application of metallurgical principles and practices to optimise furnace operation. This may be undertaken as a member of a new furnace design and development team or as part of a team optimising the operation of an existing furnace.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Select metallurgical principles and practices relevant to furnace operation	1.1. The relevant metallurgical techniques and principles and associated software and hardware technologies are selected for particular furnace design or furnace optimising situation 1.2. For existing furnaces, production records are analysed to identify opportunities for optimising furnace operation
2. Apply the relevant metallurgical principles and practices to achieve optimum furnace operation	2.1. The scientific principles are applied in a consistent and appropriate manner to obtain the best furnace operation solution taking into account metallurgical and commercial requirements 2.2. Appropriate calculations and coherent units are used in metallurgy and engineering calculations. 2.3. The techniques and associated technologies, software and hardware are applied in a consistent and appropriate manner to obtain required solutions. 2.4. Metallurgical assesments are made of metal and or alloys to ensure furnace installation or optimisation is achieving desired outcomes.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• Select appropriate metallurgy principles to suit specific furnace applications

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REQUIRED SKILLS AND KNOWLEDGE
• Select appropriate techniques and associated technologies, software and hardware to optimise furnace operation to suit specific applications • Apply and manipulate appropriate formulas for applications involving engineering and metallurgy calculations • Apply appropriate calculations to metallurgy situations • Refer solutions to the original aim of the metallurgy application. • Report results in appropriate units, using appropriate significant figures. • State limitations of solutions, due to assumptions, scientific principles and techniques used • Present solutions referring to the original aim of the application.
Required knowledge:
Competency includes sufficient knowledge of: • Metallurgy principles (as given in the range statement) • Limitations of selected basic scientific principles • Basic metallurgical techniques and related software and hardware technologies, • The limitations of basic techniques and associated software and hardware technologies

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply metallurgy principles and practice to optimise furnace operation. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • identify and predict the reaction of metals, alloys, non metallic elements, compounds and mixtures to heat; • identify the capacity and heating range of

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EVIDENCE GUIDE	
	different types of furnaces; • identify refractories appropriate for furnace and application
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Sources of information	• Reference texts • Manufacturer's catalogues and industrial magazines • Websites • Use of phone, email and fax information gathering
Furnace operation includes	• Classification of fuels • Carbonisation of coal • Properties of coke • Gaseous Fuels • Electrical energy • Heat balances • Controlled atmospheres • Temperature measurement • Combustion calculations • Refractories • Types of furnances and typical construction • Typical burners and their use in furnaces • Exhaust gas analysis for oil and gas fired furnaces

Metallurgical techniques and principles	Includes applying metallurgical techniques and principles for:
	• the prediction and analysis of the properties and metals and alloys undergoing:
	  • Smelting
	  • Refining
	  • Casting
	  • Heat treating or forging in a furnace to produce commercial metal products or to develop new alloys and processes
	• Calculation of furnace capacity, temperature range and refractory specification to achieve melting
	• Development of heat treatment or forging solutions for specified metals and alloys
	• Commercial production forecasts

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Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units	

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MSATCM513A Plan and complete metallurgical projects

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers systematical planning, designing and problem solving within a metallurgy context.

Application of the Unit

Application of the unit	Competency in this unit includes significant contribution to the planning, design and problem solving process for metallurgy applications. Planning, problem solving and design should be implemented systematically within the context of market or customer requirements and the prevailing industrial environment in accordance with planning and design parameters such as performance, financial, legal, resource and scheduling. Applications of planning and design in metallurgy may include the conceptual development, management, design, manufacture, implementation, commissioning and maintenance of products, processes, systems or services using metals and alloys into products and components into machines and systems for domestic, commercial, industrial, entertainment, civil, medical or military applications.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MEM16008A*	*Interact with computing technology*
	MEM23061A	*Select and test mechanical engineering materials*
	MEM23071A	*Select and apply mechanical engineering methods*,

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Pre-requisite Units	*MEM16008A*	*Interact with computing technology*
		processes and construction techniques
	MEM30012A	*Apply mathematical techniques in manufacturing, engineering or related situations*
	MSATCM509A	*Recommend ferrous and non ferrous metals or alloys for an application*
	MSATCM510A	*Apply metallurgical principles and techiques in welding and other thermal processes*
	MSATCM405A	*Determine and supervise heat treatment of metal*

Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Interpret the brief and clarify internal or external client requirements	1.1. Interpret the client's requirements for a metallurgical application. 1.2. Develop the project requirements and parameters with client.
2. Research and report on the context and parameters of the metallurgy project.	2.1. Research the context and parameters of the metallurgy project including the planning, design and problem solving process 2.2. Prepare a report on the commercial and metallurgical context and parameters of the metallurgy project.
3. Prepare concept proposal for metallurgical solution	3.1. A range of different approaches to achieving project objectives are generated. 3.2. Check feasibility of a range of metallurgical solutions against project parameters.

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ELEMENT	PERFORMANCE CRITERIA
	3.3. Assess metallurgical solutions for conformity to OHS&E requirements. 3.4. Seek opinions of colleagues and technical experts from other disciplines. 3.5. Prepare plan and concept proposal that includes results of feasibility study consideration including calculations and modelling 3.6. Concept proposal reviewed with client to improve outcomes and overcome possible problems.
4. Implement the planning, design or problem solving process for metallurgy project	4.1. Select and manage resources and processes to develop the plan or design. 4.2. Document management processes. 4.3. Appropriate components and systems are incorporated in the planning and design process. 4.4. Appropriate calculations and assumptions are used in implementing the planning and design process. 4.5. Appropriate computing hardware and software and programming techniques are used in the planning and design process. 4.6. Appropriate metallurgy and other scientific, engineering and commercial principles and knowledge are applied to implement planning and design process. 4.7. Concept proposal for metallurgical solution is reviewed against planning and design process in order to prepare firm metallurgical solution for client
5. Review metallurgical solution with client and prepare implementation plan	5.1. Review solution to ensure conformity with current specification, contract and organisational procedures, OHS and regulatory standards 5.2. Present and explain metallurgical solution and implementation plan to client including presentation of supporting documentation 5.3. Client acceptance of the design and implementation plan is achieved and documented.
6. Implement metallurgy project	6.1. All implementation documentation associated with project implementation is completed in accordance with organisational and statutory requirements. 6.2. Participate in implementation process and provide metallurgical oversight
7. Review metallurgical project	7.1. Project outcomes are reviewed in terms of the intended and actual outcomes and report is

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ELEMENT	PERFORMANCE CRITERIA
outcomes	prepared.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
Competency includes sufficient knowledge of: • the planning process for a comprehensive range of metallurgical applications • market and industrial context and parameters such as financial, legal, resource and scheduling of the planning and design process for a significant and particular metallurgical application • the procedures for documenting and confirming client requirements • appropriate codes, standards, specifications and legislative and regulatory requirements • implications for sustainability and options for improved environmental outcomes • constraints and risks associated with the development and implementation of metallurgical processes • process of analysis, comparison and contrasting • concept proposal review process • metallurgical fundamentals affecting selection of components and systems • metallurgy related hardware and software • properties of metal and alloys • the significance of the document control process • procedures for initiating and gaining approval for changes to metallurgy related processes • metallurgy related tests and testing schedules • reasons for selecting tests and schedules • corrective actions to return metallurgical related processes to specification
Required knowledge:
• research and report context and parameters of the planning process for a comprehensive range of metallurgy applications • plan and implement a significant metallurgy application within a market and industrial context and in conformance with project parameters such as financial, legal, resource and scheduling. • document and confirm an internal or external client's requirements in accordance with organisational procedures and practices. • inform client of known OHS, regulatory, ethical, environmental, physical and cost

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REQUIRED SKILLS AND KNOWLEDGE
limitations • write specifications to meet project requirements. • document and agree on acceptance criteria with a client • review different approaches to technical feasibility, innovation and acceptance to client • documentpossible metallurgicalproduct or process concepts • analyse,, compare and contrast the relative merits of possible metallurgical processes or products • document an objective analysis of each approach (eg. Weighted "trade-off" table) • discuss proposals with colleagues and specialists • document concept proposal in accordance with organisational procedures • establish the planning and implementation team in accordance with organisational procedures • identifyresources and establish management procedures • select components and systems • negotiate, documentand monitoroutcomes and performance measures • develop work instructions • monitorand correctproject progress • perform risk analysis and corrective action • assumptions and calculations for implementation of metallurgical processes • prepare design diagrams and calculations • apply metallurgical principles and knowledge in the implementation of the plan and design process. • select metallurgicalrelated materials • selectmetallurgical methods and processes • create demonstration models • confirm a metallurgy solution and plan • authorise modifications to the metallurgy specification in accordance with organisational procedures. • incorporate corrections and improvements to the design into the revised design solution and plan • applye OHS&E and regulatory standards • completedocumentation • obtainand review feedback from the commissioning process • monitor the project outcomes or performance in the implementation environment • address deficiencies in project outcomes or performance as measured against specifications

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Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to plan and complete metallurgical projects. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • interpret and clarify a metallurgical brief; • research metallurgy related techniques and processes • apply metallurgical skills and knowledge to solve metallurgical related problems; • comprehensively describe the properties of metals and alloys; • describe the performance parameters of metal processing equipment and materials including test equipment, furnaces, refractories, casting vessels, sands, patterns, etc. • liaise with clients, • establish project plans; • monitor metallurgy project timelines, quality outcomes, and costs; • report project outcomes.
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or

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EVIDENCE GUIDE	
	numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace.The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Parameters	May include: • competitiveness, • performance, • financial, legal, resource and scheduling implications of a metallurgical application.
Report	Reports will usually be written and include: • a description of the metallurgical processes involved in the

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RANGE STATEMENT	
	project • commercial, production and fabrication implications of different metallurgical options • occupational health, safety and environment implications of metallurgical processses related to the project Reports may be prepared by a metallurgist working alone or in conjuction with engineers, technicians and other relevant personnel.
OHS&E requirements	Include: • ensuring that all organisational and statutory requirements are met • the workforce is not exposed to hazardous worksite conditions, materials and processes • the broader community is not exposed to environmental effects of the activity.
Implementation documentation	Documentation that requires metallurgical input includes: • Gannt charts • cost and other resource requirements • standard operating procedures and other instructions for enterprise personnel • special safety and maintenance instructions; • production schedules

Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

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Co-requisite units

Co-requisite Units

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MSATCM514A Select surface treatment methods for metallic components or products

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers selecting common surface treatment processes for metals and alloys for specific applications

Application of the Unit

Application of the unit	This unit applies to metallurgical activities in manufacturing and engineering environments. Work is carried out under supervision.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify *surface treatment methods* by their principal properties	1.1. The principal properties of different surface treatments for metals and alloys are identified. 1.2. The process route for each surface treatment is identified 1.3. The advantages and disadvantages of using different methods are identified. 1.4. The effects of different types of bonding in materials are identified. 1.5. The effects of mechanical and thermal processes on the principal properties of materials are identified.
2. Select surface treatment methods for specific applications	2.1. The surface treatment requirement for the specific application is determined. 2.2. Surface treatment method is selected based on the requirement and consideration of principal properties. 2.3. Selection is confirmed according to standard operating procedures.
3. Verify selected surface treatment methods as fit for purpose	3.1. Appropriate tests for the required properties are identified. 3.2. Testing of coatings is arranged with appropriate persons, if necessary. 3.3. Test results are analysed and material choices are confirmed or modified as appropriate.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• undertake research • select surface treatment process and materials to match application outcome • carry out tests appropriate to the metal or alloy and surface treatment material • read, interpret and follow information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
Required knowledge:
Competency includes sufficient knowledge of: • surface treatment methods and principles as specified in the range statement • limitations of selected surface treatment processes

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to select surface treatment methods for metallic components or products. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • identify properties of surface to be treated or protected • select appropriate surface treatment process for surface and protection need • specify and evaluate tests of surface treated metals and alloys
Relationship to other units	

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EVIDENCE GUIDE	
	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate,

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RANGE STATEMENT	
accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Surface preparation methods include	• descaling • mechanical finishing • solvent cleaning • alkaline cleaning • measurement of surface cleanliness
Theory of electroplating includes:	• electrical circuits • current density, limiting of current density • Faraday's laws • electrolytic conductivity • polarisation • standard electrope potential • co-deposition of hydrogen • codeposition of metals • throwing power • levelling and brightening • distribution of deposits • anodes • the hull cell as the major quality control in electroplating • current density • ph • evaluation of electroplating • testing of thickness of deposit and adhesion • to understand the various methods of thickness and adhesive tests and their effectiveness. • evaluation of the characteristics of copper nickel and chromium plating • operational contrast • solution concentration • bath analysis • temperature • conditions for bright plating • effect of impurities • anodising aluminium • the principles of anodising, colouring, sealing, and testing of anodised coatings. • methods of applying zinc

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RANGE STATEMENT	
	• hot dip galvanising • continuous electrolytic tin plating • evaluation of continuous plating • comparison of zinc coating methods • metal spraying • sheradizing • zinc rich paints • practices in particular the halogen tin plating bath • vitreous enamelling
Surface treatment requirement	Surface treatment requirements may be for: • engineering • corrosion resistance • conductivity • aesthetics • other reasons Surface treatment requirements may be determined alone by a metallurgist or in conjunction with other experts and clients.
Appropriate tests	Tests which can be undertaken by a technician within the organisation as well as those required to be undertaken by external organisations, including simple tests.
Appropriate persons	Internal technicians and/or external organisations

Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

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Co-requisite units

Co-requisite Units		

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MSATCM515A Analyse metallurgical failures of components and recommend preventative measures

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit applies to identifying and analysing metallurgical failures in engineering components and recommending preventative measures

Application of the Unit

Application of the unit	This unit applies to the identification and analysis of failures in metallic engineering components where the failure is suspected of being related to the production or composition of the component. The unit applies to technician level activities in a manufacturing or engineering environments.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MSATCM406A*	*Interpret basic binary phase diagrams*
	MSATCM401A	*Prepare and examine metallographic samples*

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare failed component for failure analysis	1.1. Inspection areas are identified, cleaned and prepared for testing using appropriate procedures and materials. 1.2. Preparation processes are carried out in accordance with the relevant procedures, statutory and OH&S requirements. 1.3. Inspection areas are visually assessed and any defects identified.
2. Perform failure analysis	2.1. The most appropriate test for the material/application is selected. 2.2. Test equipment is selected and prepared in accordance with standards and/or procedures. 2.3. Test equipment is checked for defects, maintained and stored in accordance with procedures, OH&S requirements and manufacturer instructions.
3. Interpret and report the results and recommend preventative measures	3.1. Indications are assessed and defects are detected and classified in accordance with national and international codes and standards. 3.2. Defects are confirmed in accordance with enterprise procedures and industry practices. 3.3. Test results are reported in accordance with enterprise procedures, accepted industry practices and customer service requirements. 3.4. Recommendations are made to prevent future failures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

- interpret and follow procedures
- identify inspection areas
- conduct visual inspections
- identify discontinuities and defects
- select and use appropriate testing techniques, procedures and equipment
- assess risk
- perform measurements needed to meet the requirements of this unit
- undertake root cause analysis
- locate, read and interpret information on written job instructions, specifications, drawings, charts, lists and other reference documentation
- plan, sequence operations

Required knowledge:

Competency includes sufficient knowledge of:

- cleaning and preparation processes for a range of test surfaces
- procedure, statutory and OH&S requirements in relation to the preparation process
- established assessment procedures and techniques
- testing techniques and procedures for a range of situations
- tools, equipment, techniques
- hazards and safety requirements associated with testing
- maintenance and storage procedures for test equipment
- common faults and damage
- range of defects
- meaning and application of national and international codes and standards
- methods/procedures for reporting test results
- implications of test results for the particular material/application
- any applicable industry standards, national/australian standards, nohsc guides, state/territory regulatory codes of practice/standards
- use and application of personal protective equipment
- safe work practices and procedures
- relevant hazards and control measures related to the competency

Types of discontinuities and their consequences/effect on the material including:

Plastic Deformation

- elastic and plastic strain, dislocations, pile-up and interaction.
- work hardening.
- changes in strength, ductility, yield point, hardness, conductivity, corrosion resistance.

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REQUIRED SKILLS AND KNOWLEDGE
Annealing • dislocation movement and realignment during heating • recovery. nucleation of strain free areas. recrystallisation. grain growth. • accompanying changes in mechanical and physical properties listed above. Hot&Cold Working • changes in deformation mechanism with rising heat input • the effects of strain rate and temperature on work hardening. • recrystallisation and dynamic recovery. • resulting microstructure and properties. Ductile and Brittle Fracture • crack theory, mechanism of fracture • factors affecting fracture modes, Brittle fracture, Ductile fracture Fatigue • mechanism of fatigue crack nucleation • mechanism of fatigue crack growth • engineering considerations of fatigue, metallurgical factors affecting fatigue Creep • creep mechanisms • metallurgical factors affecting creep

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to analyse metallurgical failures of engineering components. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • Correctly diagnose the mode of failure of selected

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EVIDENCE GUIDE	
	cases • recommend appropriate preventative measures
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work

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RANGE STATEMENT	
environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Preparation processes	Surface cleaning ,drying, preservation of fracture surfaces
Obvious flaws	Observed changes in material homogeneity
Most appropriate tests	• collection of background data and selection of samples • preliminary examination of the failed part • non-destructive testing • mechanical testing • section, preservation and cleaning of fracture surfaces • microscopic and microscopic preparation of metallographic sections • SEM evaluation for fracture mode • EDS for chemical inconsistancies • determination of fracture type and failure origin • chemical analysis • application of fracture mechanics • simulated service testing • analysing the evidence • formulating conclusions and writing the report
Reported	Accurate identification of cause of failure and recommendation of preventative measures

Unit Sector(s)

Unit Sector	Metallurgy

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Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM516A Select non metallic materials for engineering applications

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers recognising common non-metallic materials used in engineering, assisting in the selection of a material for a specific application, and using test results to evaluate the properties of materials.

Application of the Unit

Application of the unit	This unit applies to metallurgist technician level activities in manufacturing and engineering environments where the metallurgist is also required to select or assist in the selection of non metallic materials.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify common non metallic engineering materials by their principal properties	1.1. The principal properties of thermosetting and thermoplastic polymers are identified. 1.2. The principal properties of ceramics and composite materials are identified. 1.3. The effects of different types of bonding in materials are identified. 1.4. The effects of mechanical and thermal processes on the principal properties of materials are identified.
2. Select non metallic materials for specific applications	2.1. The engineering requirement for the specific application is determined in consultation with others. 2.2. Material is selected based on the requirement and consideration of principal properties and further processing. 2.3. Selection is confirmed according to standard operating procedures
3. Verify selected non metallic material as fit for purpose	3.1. Appropriate tests for the required properties are identified. 3.2. Testing of materials is arranged with appropriate persons, if necessary. 3.3. Test results are analysed and material choices are confirmed or modified as appropriate.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• undertake research • select/carry out tests appropriate to the material • communicate • document • plan and sequence operations • read, interpret and follow information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
Required knowledge:
Competency includes sufficient knowledge of: • principles involved in selecting non metallic materials • compromises made to accommodate cost against properties

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to select non metallic materials for engineering applications. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • describe common non metallic materials and their properties • match common non -metallic materials to engineering applications • identify and arrange tests for common non metallic materials. Assessors must be satisfied that the candidate can

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EVIDENCE GUIDE	
	competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.

Common engineering non metallic materials and required properties include:	• Structure of Materials
	• Descriptions of general non-crystalline features and shoer range order. Use as examples:
	  • linear polymers: e.g., polyethylene, PVC, polystyrene
	  • elastomer: e.g., natural rubber (polyisoprene), (acrylonitrile butadiene)
	  • three dimensional networks
	  • thermosetting polymers: e.g. Phenol formaldehyde, epoxides
	  • inorganic glasses: e.g., oxide glasses, silica, borosilicate
	  • gels: e.g., asphalt and Portland cement
	• Polymers and plastics:
	  • description of the basic structural unit 'mer', monomer, polymer.
	  • addition and condensation polymerisation, briefly, with examples.
	  • distinguish between thermoplastics and thermosets with six examples of each.
	  • discuss crystallinity in polymers with examples of crystalline polymers eg, HDPE, nylon, PP, PTFE and amorphous polymers e.g: PVC, polystyrene, PMMA.
	  • relate to crystallinity to mechanical properties like rigidity and thermal transitions.
	  • additives, to include filters, reinforcements, plasticizers, UV stabilisers, anti-oxidants, lubricants, colourings and flame retardants.
	• Plastics and polymers processing and use:
	  • Emphasise the use of additives to vary polymer properties a tailor polymer to appropriate uses. Processing descriptions to include compounding, injection moulding, extrusion, blow moulding, and

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RANGE STATEMENT	
	compression moulding. • Describe the use of the major polymers in the above areas highlighting properties of importance in selected applicants by example, eg, polymers used as binders in foundry sands, dielectrical properties for electrical, low cost for agriculture, low permeability of water, oxygen for food packaging and freezer packaging. • Ceramic materials: • Describe ceramic structures of AX type with various co-ordination numbers (relate to ionic radii) use simple examples only ed, CsCl, NaCl, ZnS, Ax2, and A 2X3 types briefly with examples; two metal compounds briefly eg, BaTiO3. • Detailed structure of SiO4, tetrahedra as the basic structural unit and relate the importance to bricks, cement, glass, crockery, technical insulators. • Describe silica SiO2 and quartz. Mention refractory nature but problem of cracking under temperature chance due to structural changes. Vitreous or fused silica and properties compared to silica and especially uses with temperature change. • Introduce binary (eg, MgO-AlxO3) and ternary diagrams (eg, MgO-AlxO3-SiO2) • Manufacture of ceramic articles: • raw materials: clays, flints, feldspars, • effect of water, shaping by pressure fabrication, hydroplastic forming and slip casting. • drying and shrinkage, refer to brick and earthenware product manufacture. • describe sintering (fixing) and associated shrinkage. • engineering ceramics: eg, silicon nitride, silicon carbide. • Glass: • describe the vitreous or glassy state and the basic structural unit sio4 tetrahedra. • describes glass formers, glass modifiers and intermediates and their role in glass structure. examples of each. • properties of glass: viscosity, mechanical, optical. • special glass treatments: tempered glass, compare properties with normal annealed glass, effect of compression stresses in surface material. • explain devitrification of glass and accompanying

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RANGE STATEMENT	

	changes in properties. glass ceramics: applications.
	• Fibres:
	  • fibres and whiskers, metallic and non-metallic
	  • carbon fibres, glass, Al2O3, SiC fibres
	  • specific modulus and relation to strength to weight ration
	  • discuss economic viability of fibres
	• Composite materials:
	  • define and give examples, including concrete, wood fibre composites, glass reinforced plastics, foams, reinforced rubbers (tyres).
	  • describe the structure of fibre composite and function of fibre composites in actual applications: eg, aerospace, sporting goods.
	  • briefly cover concrete, portland cement and raw materials.
	  • define hydraulic cement mention the importance of portland cement, compositions and use.
	  • factors affecting concrete strength: eg, mixing, measuring, water/cement ration, aggregate/cement ration, aggregate strength and proportions and curing conditions.
	• Adhesives:
	  • briefly describe adhesion and adhesives.
	  • describe surface properties of liquids and solids especially wetting and non-wetting conditions, include surface tension briefly and relate to choice of adhesive and substrate.

Appropriate tests	Tests which can be undertaken by a technician within the organisation as well as those required to be undertaken by external organisations, including simple tests
Required properties	Properties to be tested include: • tensile strength • compression • shear characteristics • torsion • hardness • impact resistance • fatigue resistance • creep resistance • visual appearance and colour • magnetic properties

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RANGE STATEMENT	
	• corrosion resistance
Appropriate persons	Internal technicians and/or external organisations

Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM517A Determine corrosion prevention strategies for metal and alloys

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers applying metallurgical principles to determine strategies for minimising or avoiding corrosion of metallic components and structures in manufacturing, engineering and structural situations

Application of the Unit

Application of the unit	This unit requires application of metallurgical principles and techniques as individual or a member of a team working towards minimising corrosion of metal products, components or structures

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Research and determine corrosion prevention or minimisation need	1.1. Corrosion prevention or minimisation need is discussed with clients, other employees and other technical experts 1.2. Product performance, cost, location and environmental factors are identified 1.3. The metallurgical techniques and principles relating to corrosion are researched and reported on from appropriate sources of information and examination of corroded material 1.4. The metallurgical techniques and associated technologies required to prevent or minimise corrosion in the application are identified
2. Determine appropriate corrosion prevention or minimisation strategy and techniques for application	2.1. Appropriate corrosion prevention or minimisation strategies are selected for application. 2.2. Corrosion prevention or minimisation strategy is documented and approvals obtained from client, managers and other technical experts as appropriate. 2.3. Instructions for implementing corrosion prevention or minimisation strategy are prepared and communicated to appropriate personnel

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:

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REQUIRED SKILLS AND KNOWLEDGE
• select appropriate metallurgical principles to reduce corrosion • apply metallurgical principles to particular manufacturing, engineering and structural situations • refer solutions to the original aim of the application. • quote solutions in appropriate units, using appropriate significant figures. • quote limitations of corrosion prevention or minimisation strategies.
Required knowledge:
Competency includes sufficient knowledge of: • basic metallurgical principles (as given in the range statement) • limitations of selected metallurgical principles

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to determine corrosion prevention strategies for metal and alloys. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the ability to: • correctly identify metallurgical processes involved in corrosion and corrosion prevention; • select corrosion prevention strategies and techniques appropriate to metal or alloy application and client needs • prepare instructions for corrosion prevention for client and other appropriate personnel.
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined

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EVIDENCE GUIDE	
	by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version

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RANGE STATEMENT	
	will be used.
Metallurgical techniques and principles	Corrosion and Society • definition of corrosion • environments • corrosion damage • classificiation or corrosion • cost of erosion • social implications
Corrosion Principles	Electrochemical aspects • electrochemical reactions and chemical corrosion, galvanic cells, anode reactions, cathode reactions, concentrations cells, polarisation, passivity, pourbaix diagrams (simplified Pourbaix diagrams for Al, Fe and Zn), the driving force of corrosion, the rate of corrosion Environmental effects • oxygen and oxidisers, velocity, temperature, corrosive concentration, corrosion environments (water, soil, atmosphere, dry gasses) Metallurgical aspects • metal structures (defects, grain boundaries, second phases, cold work, residual stress), galvanic series, immunity, passivity.
Corrosion at Elevated Temperatures	Mechanism of oxide film growth: • rate laws • oxide defect structures • Pilling-Bedworth rule • oxidation of alloys • catastrophic oxidations • de carburisation • high temperature resistent alloys
Forms of corrosion	• Uniform corrosion (general corrosion) • Galvanic corrosion • Crevice corrosion • Pitting corrosion • Fretting corrosion • Selective attack (leaching) • Intergranular corrosion • Stray current corrosion (electrolysis) • Erosion corrosion and cavitation damage

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RANGE STATEMENT	
	• Stress corrosion cracking • Corrosion fatigue • Hydrogen damage • Microbial corrosion
Basic principles of Corrosion Control	Material selection • metals and alloys, metal purification, nonmetallics, stress relief Alteration of environment • changing media, temperature, velocity, oxygen concentration, etc. Corrosion protection • cathodic protection, anodic, protection and passivation, corrosion inhibitors, chemical conversion coatings, metal coatings, corrosion-preventing paints, coatings of plastic and rubber, temporary corrosion prevention. Corrosion prevented by design • wall thickness, design rules (streamlining, stagnation, crevices, metallic contact, etc.)
Corrosion Characteristics of common alloys	• Steel and cast iron • Stainless steel • Aluminium and its alloys • Copper and its alloys
Methodology of corrosion investigations	• Corrosions testing • Corrosion monitering • Electrochemical investigations • Physical methods
Sources of information	• Reference texts • Manufacturers' catalogues and industrial magazines • Websites • Use of phone, email and fax information gathering

Unit Sector(s)

Unit Sector	Metallurgy

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Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCM518A Interpret complex binary phase diagrams

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers the knowledge and skills needed to interpret complex phase diagrams and so predict the microstructures of binary alloys and the behaviour of metals and alloys under quenching.

Application of the Unit

Application of the unit	This unit applies to the interpretation of cooling phase diagrams as used in metallurgy. The application will primarily be to phase diagrams of metals and alloys showing temperature and composition variables. In a typical scenario, a metallurgical technician will be required to recommend a phase transition process in order to obtain a required microstructure, or to predict a microstructure from a known phase transition process.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	*MSATCM304A*	*Interpret basic binary phase diagrams*

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify the microstructures from an equilibrium cooling phase diagram	1.1. Phase diagram for metal or alloy is obtained from internal or external sources 1.2. Identify number, composition, proportion and structural arrangement of phases including intermediate phases, in binary alloys. 1.3. Describe structural changes due to varying proportion of alloying elements and temperature. 1.4. Describe the phase changes, intermetallic compounds and solid solutions if any for chosen binary alloy 1.5. Describe the final microstructures of binary alloys cooled under equilibrium conditions from the melt or during heat treatment and quenching operations.
2. Identify the microstructures from a non equilibrium cooling phase diagram	2.1. Phase diagram for metal or alloy is obtained from internal or external sources 2.2. Identify number, composition, proportion and structural arrangement of phases including intermediate phases, in binary alloys. 2.3. Describe structural changes due to varying proportion of alloying elements and temperature. 2.4. Describe the phase changes, intermetallic compounds and solid solutions if any for chosen binary alloy 2.5. Describe the final microstructures of binary alloys cooled under equilibrium conditions from the melt or during heat treatment and quenching operations
3. Recognise characteristic microstructures of binary alloys.	3.1.. Recognise characteristic structures of dendrites (homogeneous and cored) columnar and equiaxed grains. 3.2. Recognise characteristic structures resulting from

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ELEMENT	PERFORMANCE CRITERIA
	eutectic, eutectoid and peritectic reactions. 3.3. Recognise characteristic structures resulting from solid state precipitation. 3.4. Recognise characteristic structures resulting from different quenching rates

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• produce a complex binary phase diagram from supplied data • estimate composition from the structure of a phase diagram • predict structure from the composition from a phase diagram
Required knowledge:
Competency includes sufficient knowledge of: • methods of construction of complex phase diagrams for binary alloys. • the phase changes that occur in binary alloy systems through heating, slow cooling and quenching as recorded by the appropriate phase diagrams. • the equilibrium and non equilibrium cooling of binary alloys and the resulting microstructures in cast and heat treated material.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	The person will be able to interpret binary phase diagrams. Assessment may be by workplace project, case study or suitable alternative.
Critical aspects for assessment and	It is essential that competence is demonstrated in the

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EVIDENCE GUIDE	
evidence required to demonstrate competency in this unit	ability to: • recognise and use correct scientific terminology in regards to phase diagrams • source phase diagrams and other reference material from internal or external sources • use phase diagrams to interpret intermediate and final phase structures of binary alloys
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Scientific techniques and principles of cooling phase diagrams relate to	• Equilibrium phase diagrams • Non-equilibrium phase diagrams • Effect of temperature and alloying elements on structural changes • Structures of homogenous and cored dendrites • Structures of columnar and equiaxed grains • Eutectic, eutectoid and peritectic reactions

Unit Sector(s)

Unit Sector	Metallurgy

Competency field

Competency Field	

Co-requisite units

Co-requisite Units		

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MSATCS301A Interpret architectural and engineering design specifications for structural steel detailing

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the skills and knowledge required to interpret design related information required for the commencement of a structural steel detailing project.

Application of the Unit

Application of the unit	This unit applies to the initial receiving and checking of design related information by structural steel detailers including obtaining additional information or clarifying information already received. Structural steel detailers must obtain and interpret design related information from architects and consulting engineers in order to carry out structural steel detailing. The unit may apply to structural steel detailing carried out for residential, commercial, industrial or mining fabrication and construction projects. The unit assumes that knowledge of basic technical drawing conventions and procedures such as view, dimensioning, drawing layout, etc. is already held. Work is conducted according to defined procedures. Work may be conducted in small to large scale enterprises and may involve individual and team activities. This unit requires the application of skills associated with planning and organising to complete structural steel detail drawings. Communication and numeracy skills are used to refer to patterns and specifications and complete and label sketches. Self management skills are used to ensure conformance of own work to quality standards.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*MEM09002B*	*Interpret technical drawing*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Obtain and check adequacy of design related information for structural steel detailing purposes	1.1. General arrangement drawings are obtained and interpreted including standard symbols, terms and figures used by designers 1.2. Adequacy of arrangement information is checked against detailer and client requirements 1.3. Design information is checked for any drawings or descriptions of any members, connections, components or details that lie outside the scope of standard structural practice 1.4. Information on suspended floors is obtained and checked 1.5. Column base layouts and schedules, if any, are

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ELEMENT	PERFORMANCE CRITERIA
	checked 1.6. Specifications for grades of steel and bolt grades are obtained and checked 1.7. Information on standards and other design related specifications to be shown on detail drawings is checked
2. Obtain additional information where required	2.1. Requests for further information (RFIs) are submitted according to enterprise and project procedures 2.2. Adjustments to design information are made based on RFI responses and noted according to standard drawing office procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- assess design information for adequacy of information needed for structural steel detailing
- liaise with architects and engineers
- assess scope of structural steel detailing tasks and priorities
- interpret design drawings, sketches and schedules
- work according to OHS practices of the enterprise and workplace which may include requirements prescribed by legislation, awards, agreements and conditions of employment, standard operating procedures, or oral, written or visual instructions
- communicate at all levels about technical issues related to patterns and specifications
- reading and numeracy is required to the level of interpreting workplace documents and technical information

Required knowledge

- architectural and engineering design drawings including standard symbols, terms, abbreviations and sketches
- structural steel members and connections used in structural steel construction
- the difference between design and detail drawing processes
- drawing office procedures

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REQUIRED SKILLS AND KNOWLEDGE
• fabrication processes and procedures

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge to: • identify and interpret architect and engineer design specifications for structural steel constructions including constructions with suspended floors • relate design information to structural steel detailing processes including checking of adequacy of design information for the construction • establish efficient administrative arrangements for liaison with designers including arrangements for formal requests for further information • establish drawing and document control procedures
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment Resource implications for this unit include: • access to real or appropriately simulated detailing of structural steel constructions including provision of suitable design information • computer with suitable CAD software or manual drafting equipment and material including work areas, materials and equipment • access to steel and component manufacturers' catalogues or websites • access to relevant standards through either hard copy or internet access. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.

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EVIDENCE GUIDE	
	Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application • Assessment may be applied under project related conditions (real or simulated) and require evidence of process • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances • Assessment may be in conjunction with assessment of other units of competency where structural steel detailing is involved
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Legislative/regulatory	All work must comply with relevant Federal and

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RANGE STATEMENT	
requirements	State or Territory legislative or regulatory requirements
Drawings	For the purposes of this unit drawings refers to both hard copy and software files including CAD files
Designers	Designers include architects and consulting engineers. The design information may also be provided via drawings produced by design draftspersons
Adequacy	Adequacy means that sufficient design information is provided to enable the structural steel detailer to prepare drawings that will provide all information required for fabrication and erection
Adequacy of arrangement information	Adequacy of arrangement information refers to the information normally provided on arrangement or layout drawings provided by architects and/or consulting engineers. This information includes: • building orientation • layout on a site and relationship to any other structures • primary dimensions • floor levels • beam spacing • column centres • sizes for all members, for example, beams, trusses, columns, rafters, purlins, girts, braces, crane beams • dimensions and layout drawing for any special features, for example, stairs, landings, fire escapes, and so on
Client requirements	Client requirements may include: • shop detail drawings, erection diagrams and material schedules and lists • program and format for CAD files and models • downloading by the structural steel detailer of files direct to client computers and CNC

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RANGE STATEMENT	
	machines • size and number of hard copy drawings • specification of programs and requirements for word processed documents, spreadsheets, presentations, invoices, and so on
Suspended floors	Suspended floors may consist of reinforced concrete slab, composite slab, pre-cast planks and topping, steel plate or grating, or other specified material
Work environment	Detailing may be undertaken in a variety of work environments including commercial, home office or fabrication or construction enterprise. Work may be performed individually on a contracting/project basis or as part of a project team and in response to combinations of paper based and electronic instructions.

Unit Sector(s)

Unit sector	Structural steel detailing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATCS302A Detail bolts and welds for structural steelwork connections

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the skills and knowledge required to detail bolts and welds for structural steelwork connections consistent with design specifications.

Application of the Unit

Application of the unit	This unit applies to a structural steel detailer who has to detail various types of bolts and welds for structural steelwork connections. The detailing may be done manually or by using CAD and/or proprietary steel detailing software. The unit may apply to structural steel detailing carried out for residential, commercial, industrial or mining fabrication and construction projects. The unit assumes that knowledge of basic technical drawing conventions and procedures such as view, dimensioning, drawing layout, etc. is already held. Work is conducted according to defined procedures. Work may be conducted in small to large scale enterprises and may involve individual and team activities. This unit requires the application of skills associated with planning and organising to complete structural steel detail drawings. Communication and numeracy skills are used to refer to patterns and specifications and complete and label sketches. Self management skills are used to ensure conformance of own work to quality standards.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*MEM09002B*	*Interpret technical drawing*
	MEM05051A	*Select welding processes*
	MSATCS301A	*Interpret architectural and engineering design specifications for structural steel detailing*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine shop and field connections from design drawings	1.1. Fabrication shop capabilities and preferences are discussed with fabricator 1.2. Connections are allocated as shop or field welded in conjunction with fabricator 1.3. Connections to be field bolted are allocated and extent of shop preparation of connections decided 1.4. Connection fittings are allocated to either columns

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ELEMENT	PERFORMANCE CRITERIA
	or beams to suit fabrication efficiency or design requirements 1.5. A request for further information (RFI) is made to design engineer where clarification of requirements is needed
2. Detail bolts for connections	2.1. Knowledge of standard bolting category identification system is demonstrated 2.2. Bolt types and sizes for each connection are specified using design information and consideration of commercial availability 2.3. Bolt and thread lengths are selected according to design specifications, and connection requirements 2.4. Bolt and bolt holes are detailed taking into account AS 4100 requirements, tightening and tensioning specifications and clearances 2.5. Field bolt list is prepared and checked and sent to fabricator
3. Detail welds for connections	3.1. Knowledge of joint and weld types is demonstrated 3.2. Shop and field welds are identified 3.3. Standard welding symbols are used 3.4. Clearances for welding are applied 3.5. Field weld details are placed on erection plans and shop drawings and submitted to design engineer for approval

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• assess design information for adequacy of information needed for structural steel detailing • liaise with design engineers • assess scope of structural steel detailing tasks and priorities • interpret design drawings, sketches and schedules • determine bolt and thread length taking into account: • shank lengths as defined in AS 1111 and AS 1252

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REQUIRED SKILLS AND KNOWLEDGE
• whether the thread is to be included or excluded in the shear plane • grip and ply thicknesses • thread projection as per AS 4100 • nut and washer requirements • detail welds consistent with design information and AS4100 and AS 1101 Part 3 • work according to OHS practices of the enterprise and workplace which may include requirements prescribed by legislation, awards, agreements and conditions of employment, standard operating procedures, or oral, written or visual instructions • communicate at all levels about technical issues related to patterns and specifications • reading and numeracy is required to the level of interpreting workplace documents and technical information
Required knowledge

• architectural and engineering design drawings including standard symbols, terms, abbreviations and sketches
• structural steel members and connections used in structural steelwork
• the difference between design and detail drawing processes
• drawing office procedures
• fabrication processes and procedures
• the Australian steel structures limit state design code's (AS4100) requirements in so far as they impact on steel detailing
• Australian standard bolting category identification system
• bolt and thread length considerations including:
  • shank lengths as defined in AS 1111 and AS 1252
  • inclusion or exclusion of the shear plane in the thread
  • grip and ply thicknesses
  • thread projection requirements as per AS 4100
  • nut and washer requirements
• standard welding symbols as described in AS 1101 Part 3 welding theory and processes

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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EVIDENCE GUIDE	
Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge to: • identify and interpret engineering design specifications for structural steel bolted and welded connections • relate design information to structural steel detailing processes • correctly use the Australian standard bolting category identification system • understand and apply the relevant sections of AS 1101 Part 3, AS4100, AS 1111 and AS 1252
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment Resource implications for this unit include: • access to real or appropriately simulated detailing of ancillary structural steelwork including provision of suitable design information for bolts and welds • computer with suitable CAD software or manual drafting equipment and material including work areas, materials and equipment • access to steel and component manufacturers' catalogues or websites • access to relevant standards through either hard copy or internet access. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge • Assessment methods must be by direct observation of

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EVIDENCE GUIDE	
	tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application • Assessment may be applied under project related conditions (real or simulated) and require evidence of process • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances • Assessment may be in conjunction with assessment of other units of competency where structural steel detailing is involved
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Legislative/regulatory requirements	All work must comply with relevant Federal and State or Territory legislative or regulatory requirements
Bolt and thread lengths	Bolt and thread lengths may be specified by the engineer or by the detailer
Standard welding symbols	Standard welding symbols as described in AS 1101 Part 3
Work environment	Detailing may be undertaken in a variety of work environments including commercial, home office or fabrication or construction enterprise.

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RANGE STATEMENT	
	Work may be performed individually on a contracting/project basis or as part of a project team and in response to combinations of paper based and electronic instructions.

Unit Sector(s)

Unit sector	Structural steel detailing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATCS501A Detail standardised structural connections

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the skills and knowledge required to identify bolted or welded connections for structural steelwork that is consistent with design specifications and to detail these connections in structural steelwork detailed drawings. Both steel to steel and steel to non-steel connections are covered by this unit. Portal frame haunch connections, column base plate and holding down bolt layouts, and steel to non-steel connections are also covered by this unit.

Application of the Unit

Application of the unit	This unit applies to a structural steel detailer who has to detail the various types of standard connections used in structural steelwork. Standard connections are those listed in the latest edition of the Australian Steel Institute's *Standardised Structural Connections* publication. Connections covered include flexible and rigid connections and purlin cleats. The unit may apply to structural steel detailing carried out for residential, commercial, industrial or mining fabrication and construction projects. The detailing may be done manually or by using CAD and/or proprietary steel detailing software. The unit assumes that knowledge of basic technical drawing conventions and procedures such as view, dimensioning, drawing layout, etc. is already held. Work is conducted according to defined procedures. Work may be conducted in small to large scale enterprises and may involve individual and team activities.

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	This unit requires the application of skills associated with planning and organising to complete structural steel detail drawings. Communication and numeracy skills are used to refer to patterns and specifications and complete and label sketches. Self management skills are used to ensure conformance of own work to quality standards.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*MEM09002B*	*Interpret technical drawing*
	MEM05051A	*Select welding processes*
	MSATCS301A	*Interpret architectural and engineering design specifications for structural steel detailing*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine shop and field connections from design drawings	1.1. Fabrication shop capabilities and preferences are discussed with fabricator 1.2. Connections are allocated as shop or field welded in conjunction with fabricator 1.3. Connections to be field bolted are allocated and extent of shop preparation of connections decided 1.4. Connection fittings for structural connections are allocated to either columns or beams to suit fabrication efficiency or design requirements
2. Identify required connections	2.1. Members requiring connections are identified from design information and any potential or specified non standard connections are identified 2.2. Design information is checked for specification of standard and non standard connections 2.3. Adequacy of design information for non standard connections is checked and request for further information made if necessary 2.4. Standard connections not specified by the designer are identified and connection type specified in conjunction with the fabricator 2.5. Approval is sought from designer before detailing and fabrication
3. Detail connections	3.1. Connections suitable for standard detailing parameters are identified and detailed 3.2. Connection components are detailed using standard detailing parameters 3.3. Copes and notches are detailed for beams and columns as required 3.4. Non standard connections are detailed according to supplied design information
4. Detail purlin and girt cleats	4.1. Purlins and girts are identified on design information 4.2. Cleat length and bolt spacing is identified from purlin or girt manufacturer's instructions or design information 4.3. Cleats are detailed
5. Detail haunches for portal frame buildings	5.1. Haunch specifications, bolting information, eave and apex information supplied by designer are checked 5.2. Exact haunch sizes and dimension haunches on shop drawings and erection diagrams are calculated

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ELEMENT	PERFORMANCE CRITERIA
	5.3. Pre-sets for column tops are inserted into shop drawings and erection plans where specified in design information
6. Detail column base plates	6.1. Holding down bolt layout plan is prepared according to design information 6.2. Grouts and shims are specified for column base plates 6.3. Holding down bolts are specified from design information
7. Detail steel to non-steel connections	7.1. Edge clearances for concrete and other non-steel members or components are determined from designer or non-steel detailer 7.2. Casting plates types are identified from design information 7.3. Reinforcement locations are identified and clashes with connections avoided 7.4. Interference with post tensioning cables and holding down bolts is avoided for upper floor connections 7.5. Fixings are identified from design information 7.6. Steel to non-steel connections are detailed according to design information

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- assess design information for adequacy of information needed for structural steel detailing
- liaise with architects and engineers
- assess scope of structural steel detailing tasks and priorities
- interpret design drawings, sketches and schedules, to determine dimensions, layouts, types and grades of materials
- interpret manufacturers catalogues and product information
- use basic trigonometry to determine dimensions not given in design information
- work according to OHS practices of the enterprise and workplace which may include requirements prescribed by legislation, awards, agreements and conditions of employment, standard operating procedures, or oral, written or visual

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REQUIRED SKILLS AND KNOWLEDGE
instructions • communicate at all levels about technical issues related to patterns and specifications • reading and numeracy is required to the level of interpreting workplace documents and technical information
Required knowledge
• architectural and engineering design drawings including standard symbols, terms, abbreviations and sketches • connections used in structural steel construction • the difference between design and detail drawing processes • drawing office procedures • fabrication processes and procedures • the Australian steel structures limit state design code's (AS4100) requirements in so far as they impact on steel detailing • characteristics of portal frame construction especially the behaviour of the frame under load and points of high stress

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	•
Critical aspects of for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge to: • identify and interpret architect and engineer design specifications for structural steel constructions including design information for steel to steel and steel to non-steel connections • relate design information to structural steel detailing processes for connections • establish efficient administrative arrangements for liaison with designers including arrangements for formal requests for further information • establish drawing and document control procedures • identify standard components and connections from industry publications, manufacturers' catalogues and

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EVIDENCE GUIDE	
	Australian or other relevant standards
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment Resource implications for this unit include: • access to real or appropriately simulated detailing of structural steel connections including provision of suitable design information • computer with suitable CAD software or manual drafting equipment and material including work areas, materials and equipment • access to steel and component manufacturers' catalogues or websites • access to relevant standards through either hard copy or internet access. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application • Assessment may be applied under project related conditions (real or simulated) and require evidence of process • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances • Assessment may be in conjunction with assessment of other units of competency where structural steel detailing is involved

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EVIDENCE GUIDE	
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Legislative/regulatory requirements	All work must comply with relevant Federal and State or Territory legislative or regulatory requirements
Connections	All connections are steel to steel unless specifically noted
Design information	Design information is the information provided to the detailer and fabricator by the architects and consulting engineers for a project. For some projects the design information may only be provided by an engineer. The design information will usually be in the form of design drawings or sketches but may also be via material lists and written instructions and computer files
Standard connections	Standard connections are those specified in the Australian Steel Institute's publication *'Standardised Structural Connections'*

Connection type	• Connections may be standard flexible or rigid connections
	• Flexible connections may include:
	  • angle seats
	  • bearing pads
	  • flexible end plates

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RANGE STATEMENT	
	• angle cleats • web side plates • Rigid connections may include: • fully welded end plates • bolted moment end plates
Standard detailing parameters	Standard detailing parameters are connections suitable to be detailed using the standard bolting and welding specifications contained in the Australian Steel Institute's publication 'Standardised *Structural Connections'*. These details include: • size of fillet welds • electrode and MIG welding wire specification • bolt type and size • arrangement of holes for bolts • back gauge dimensions and minimum edge distances • distance from beam top to the first row of bolts • detailing parameters for components such as cleat plates, gussets, end plates, base plates and angle plates
Components	Components may include cleat plates, gussets, end plates, base plates and angle plates
Standard welding symbols	Standard welding symbols as described in AS 1101 Part 3
Non-steel connections	Non-steel connections are those between steel members and concrete, timber, glass or plastic or other building or fabricated component required to be shown on a structural steel detail drawing. The connection may be for structural or decorative purposes. An example would be steel supports for a timber deck
Haunch specifications	Haunches are special connections used in portal frame buildings. Haunch specifications supplied by designers will normally include: • roof slope • details of haunch location and size sufficient to ensure design requirements

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RANGE STATEMENT	
	• end plate specification • bolting information • location and sizes of welds • fly bracing requirements
Fixings	Fixings may include standard bolts, dynabolts, chemsets, female internal thread tube bolts, and other specialist steel to non-steel fixings
Work environment	Detailing may be undertaken in a variety of work environments including commercial, home office or fabrication or construction enterprise. Work may be performed individually on a contracting/project basis or as part of a project team and in response to combinations of paper based and electronic instructions.

Unit Sector(s)

Unit sector	Structural steel detailing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATCS502A Detail structural steel members

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the skills and knowledge required to detail structural steel members in steel framed constructions. These members can include beams, girders, columns, trusses, rafters, rakers, tie beams and temporary and permanent braces.

Application of the Unit

Application of the unit	This unit applies to a structural steel detailer who has to detail structural steel members used in steel constructions. These members can include beams, girders, columns, trusses and braces. Only the most common structural members are considered in this unit. However, the detailing principles and skills covered in this unit can usually be applied to any non standard members specified by designers. In this unit the term beam is interchangeable with the term girder and only 'beam' or 'beams' are used. The unit may apply to structural steel detailing carried out for residential, commercial, industrial or mining fabrication and construction projects. The detailing may be done manually or by using CAD and/or proprietary steel detailing software. The unit assumes that knowledge of basic technical drawing conventions and procedures such as view, dimensioning, drawing layout, etc. is already held. Work is conducted according to defined procedures. Work may be conducted in small to large scale enterprises and may involve individual and team activities. This unit requires the application of skills associated with

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	planning and organising to complete structural steel detail drawings. Communication and numeracy skills are used to refer to patterns and specifications and complete and label sketches. Self management skills are used to ensure conformance of own work to quality standards.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*MEM09002B*	*Interpret technical drawing*
	MSATCS301A	*Interpret architectural and engineering design specifications for structural steel detailing*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA

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ELEMENT	PERFORMANCE CRITERIA
1. Detail beams	1.1. Location and number of beams are identified from design information 1.2. Beam direction marks are inserted according to industry practice or specific project needs 1.3. Beam dimensions are obtained from design information and inserted into shop drawings 1.4. Beam section designation and cut length are inserted into elevation detail and material list along with any general notes 1.5. Beam levels and beam erection marks and erection clearances are inserted 1.6. Any surface treatment notes are inserted as per design information
2. Detail columns	2.1. Timing and process for detailing of columns is discussed with fabricator to ensure suitability for fabrication schedules 2.2. Column design information is analysed to identify all column connections 2.3. Vertical or horizontal detailing position and viewing direction is elected to suit client requirements and drawing office practice 2.4. Dimensions for columns are inserted from design information 2.5. Sectional views for splices are drawn as per design information 2.6. Plan views for intermediate sections are drawn to illustrate required connections 2.7. Direction and level marks as well as shim and lifting hitches are inserted as required according to design information
3. Detail beam and column splices	3.1. Welded and bolted splices are identified from design information 3.2. Splices to be field welded are identified and checked with fabricator 3.3. Access for welder and electrode is considered for field welded splices 3.4. Column or beam splice is detailed according to design information
4. Detail trusses	4.1. Working points and bevels are established from design information 4.2. Layouts for joints are drawn using appropriate scale

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ELEMENT	PERFORMANCE CRITERIA
	4.3. Opportunities for symmetry and rotation are noted and used in layouts with approval of fabricator 4.4. Trusses are dimensioned including placement of working dimensions, intermediate panel points, other reference points and camber allowances for cambered trusses 4.5. Bolted gussets for node points are set out using design information and fabricator preferences 4.6. Node points for welded trusses are detailed including set back of member ends and landing for welds using design information and fabricator preferences
5. Detail bracing	5.1. Layout and size of bracing are determined from design information 5.2. Setting out points and distances between setting out points are determined 5.3. Braces are detailed including bracing connections, allowances for clearances and draw if any
6. Detail purlins, girts and eaves struts	6.1. Layout and type of purlins, girts and eave struts to be used is determined from design information, manufacturers' catalogues and fabricator preferences 6.2. Bridging for purlins and girts is determined from design information 6.3. Purlins, girts and eaves are detailed consistent with design information

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- assess design information for adequacy of information needed for structural steel detailing
- liaise with architects and engineers
- assess scope of structural steel detailing tasks and priorities
- interpret design drawings, sketches and schedules
- work according to OHS practices of the enterprise and workplace which may include requirements prescribed by legislation, awards, agreements and conditions of employment, standard operating procedures, or oral, written or visual

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REQUIRED SKILLS AND KNOWLEDGE
instructions • communicate at all levels about technical issues related to patterns and specifications • reading and numeracy is required to the level of interpreting workplace documents and technical information
Required knowledge
• architectural and engineering design drawings including standard symbols, terms, abbreviations and sketches • connections used in structural steel construction • the difference between design and detail drawing processes • drawing office procedures • fabrication processes and procedures • the Australian steel structures limit state design code's (AS4100) requirements in so far as they impact on steel detailing

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects of assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge to: • identify and interpret architect and engineer design specifications for structural steel members and their connections • relate design information to detailing of structural steel members • establish efficient administrative arrangements for liaison with designers • establish drawing and document control procedures • identify standard components and connections from industry publications, manufacturers' catalogues and Australian or other relevant standards
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment

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EVIDENCE GUIDE	
	Resource implications for this unit include: • access to real of appropriately simulated detailing of structural steel members including provision of suitable design information • computer with suitable CAD software or manual drafting equipment and material including work areas, materials and equipment • access to steel and component manufacturers' catalogues or websites • access to relevant standards through either hard copy or internet access. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application • Assessment may be applied under project related conditions (real or simulated) and require evidence of process • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances • Assessment may be in conjunction with assessment of other units of competency where structural steel detailing is involved
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being

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EVIDENCE GUIDE	
	performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Legislative/regulatory requirements	All work must comply with relevant Federal and State or Territory legislative or regulatory requirements
Design information	Design information is the information provided to the detailer and fabricator by the architects and consulting engineers for a project. For some projects the design information may only be provided by an engineer. The design information will usually be in the form of design drawings or sketches but may also be via material lists, written instructions or computer files
Direction marks	Direction marks are indicated on the shop drawings and on the beam or girder by the words 'North' or 'West' as applicable. Industry standard practice is to determine the placement of these marks by viewing and numbering the beams and girders from the bottom or right hand edge of the floor plan. Variations from this practice may occur on specific projects and should be noted on the erection plan
Beam dimensions	Beam dimensions are obtained from design information in conjunction with Design Capacity Tables (see below) and manufacturers' catalogues. Beam dimensions to be inserted into shop drawings should include: • longitudinal dimensions • centre to centre distance between supports

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RANGE STATEMENT	
	• overall length of the beam • overall cut length of the beam • dimensions of holing and other details occurring along the length of the beam. The method of showing hole dimensions may be centre to centre, consecutively from end to end of beam or as running dimensions according to the needs of the fabricator • longitudinal dimensions to groups of holes in the web or flange • vertical dimensions to top most holes for end connection elements Additional dimensions and symbols may be required for non-proprietary welded plate girders. These dimensions and symbols would be specified by the designer and would normally include web and flange dimensions, web stiffener locations and welding symbols
Working points	Working points for trusses may also be referred to as setting out points or intersection points
Design Capacity Tables	Design Capacity Tables refers to the publication 'Design *Capacity Tables for Structural Steel*, *Volume 1*: *Open* Sections' published by the Australian Steel Institute
Connections	All connections are steel to steel unless specifically noted
Standard connections	Standard connections are those specified in the Australian Steel Institute's publication 'Standardised *Structural* Connections'
Connection type	• Connections may be standard flexible or rigid connections • Flexible connections may include: • angle seats • bearing pads • flexible end plates • angle cleats • web side plates • Rigid connections may include:

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RANGE STATEMENT	
	• fully welded end plates • bolted moment end plates
Standard detailing parameters	Standard detailing parameters are connections suitable to be detailed using the standard bolting and welding specifications contained in the Australian Steel Institute's publication 'Standardised *Structural Connections'*. These details include: • size of fillet welds • electrode and MIG welding wire specification • bolt type and size • arrangement of holes for bolts • back gauge dimensions and minimum edge distances • distance from beam top to the first row of bolts • detailing parameters for components such as cleat plates, gussets, end plates, base plates and angle plates
Components	Components may include cleat plates, gussets, end plates, base plates and angle plates
Standard welding symbols	Standard welding symbols as described in AS 1101 Part 3
Non-steel connections	Non-steel connections are those between steel members and concrete, timber, glass or plastic or other building or fabricated component required to be shown on a structural steel detail drawing. The connection may be for structural or decorative purposes. An example would be steel supports for a timber deck
Fixings	Fixings may include standard bolts, dynabolts, chemsets, female internal thread tube bolts, and other specialist steel to non-steel fixings
Work environment	Detailing may be undertaken in a variety of work environments including commercial, home office or fabrication or construction enterprise. Work may be performed individually on a contracting/project basis or as part of a project team and in response to combinations of paper

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RANGE STATEMENT	
	based and electronic instructions.

Unit Sector(s)

Unit sector	Structural steel detailing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATCS503A Incorporate structural steel detailing into fabrication and construction project management

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the skills and knowledge required to undertake structural steel detailing in a manner consistent with procedures and timelines for fabrication and construction projects. The unit requires knowledge of the roles of architects, engineers, builders and fabricators and the skill to interpret project schedules and timelines and their implications for structural steel detailing.

Application of the Unit

Application of the unit	This unit applies to structural steel detailers who are required to liaise with architects, consulting engineers, builders and fabricators at the commencement of a project to establish structural steel detailing arrangements that are consistent with the policies, procedures and timelines of fabrication or construction projects. The unit may apply to structural steel detailing carried out for residential, commercial, industrial or mining projects. Work is conducted according to defined procedures. Work may be conducted in small to large scale enterprises and may involve individual and team activities. This unit requires the application of skills associated with planning and organising to complete structural steel detail drawings. Communication and numeracy skills are used to refer to patterns and specifications and complete and label sketches. Self management skills are used to ensure conformance of own work to quality standards.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Demonstrate knowledge of steel construction and fabrication processes and roles	1.1. Steel construction stages of design, detailing, fabrication and erection are understood 1.2. Major codes and standards relevant to steel construction activities can be identified 1.3. Roles and responsibilities of architects, engineers, draftspersons and detailers, fabricators and builders can be explained
2. Determine client requirements for structural steel detailing	2.1. Client for structural steel detailing is determined 2.2. Contacts for architect, consulting engineer, builder and fabricator are obtained 2.3. Project timeline and schedules are obtained and

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ELEMENT	PERFORMANCE CRITERIA
	delivery dates for detail drawings determined 2.4. Procedures for making requests for further information (RFIs) from designers are agreed 2.5. Requirements for attendance at team meetings and site visits are determined 2.6. Client requirements in relation to format, number and type of shop and erection drawings and other required detailing information is determined
3. Obtain design information for project	3.1. Design information is obtained from architect and consulting engineer 3.2. Design information and project schedules are used to assess the scope and complexity of detailing tasks
4. Establish structural steel detailing arrangements for project	4.1. Details of structural steel detailing team are communicated to client 4.2. Document control procedures including numbering, access, filing and revision and updating approval procedures are established according to enterprise procedures and client requirements 4.3. Steel detailing tasks and deadlines are established and checked against construction project schedules 4.4. Capabilities of proprietary CAD and steel detailing software for project is assessed and decision is made to use computer based or manual structural detailing methods

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• communicate own and team capabilities • negotiate with clients • assess scope of structural steel detailing tasks and priorities • use Gannt charts and other project management scheduling tools • assess suitability of specialist software for particular steel detailing projects • work according to OHS practices of the enterprise and workplace which may include requirements prescribed by legislation, awards, agreements and conditions of employment, standard operating procedures, or oral, written or visual

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REQUIRED SKILLS AND KNOWLEDGE
instructions • communicate at all levels about technical issues related to patterns and specifications • reading and numeracy is required to the level of interpreting workplace documents and technical information
Required knowledge
• roles and responsibilities of owners, architects, engineers, fabricators, builders and structural steel detailers in construction projects • construction and fabrication project management practices including use of Gannt charts and other scheduling tools • difference between design and detail drawing processes • drawing office procedures • proprietary and non-proprietary CAD and specialist steel detailing programs

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge to: • identify client and design requirements for a structural steel detailing project • establish structural steel detailing task schedule and timelines and integrate them into the broader project plan and timelines • establish efficient administrative arrangements for liaison with clients and designers • establish drawing and document control procedures
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment Resource implications for this unit include: • access to real or appropriately simulated detailing of structural steelwork constructions including provision of suitable design information

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EVIDENCE GUIDE	
	• access to real or simulated fabrication and construction schedules • computer with suitable CAD software or manual drafting equipment and material including work areas, materials and equipment • access to steel and component manufacturers catalogues or web sites • access to relevant standards through either hard copy or internet access. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application • Assessment may be applied under project related conditions (real or simulated) and require evidence of process • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances • Assessment may be in conjunction with assessment of other units of competency where structural steel detailing is involved
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Legislative/regulatory requirements	All work must comply with relevant Federal and State or Territory legislative or regulatory requirements
Client	The term client in this unit refers to the organisation commissioning the production of structural steel detail drawings and will normally be the fabricator of structural steel elements of a construction project. However, depending on the project the client may vary and could be the consulting engineer, or in the case of mining projects, it could be the mining company. The client may commission structural steel detail drawing from either internal or external structural steel detailers
Schedules	Schedules may include Gannt charts, contract schedules, lists of contractors, contracted suppliers and any other lists or diagrams relevant to determining the required delivery dates for structural steel detail drawings
Client requirements	Client requirements may include: • shop detail drawings, erection diagrams and material schedules and lists • program and format for CAD files and models • downloading by the structural steel detailer of files direct to client computers and CNC machines • size and number of hard copy drawings • specification of programs and requirements for word processed documents, spreadsheets, presentations, invoices and so on

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RANGE STATEMENT	
Design information	Design information is the information provided to the detailer and fabricator by the architects and consulting engineers for a project. For some projects the design information may only be provided by an engineer. The design information will usually be in the form of design drawings or sketches but may also be via material lists and written instructions.
Work environment	Detailing may be undertaken in a variety of work environments including commercial, home office or fabrication or construction enterprise. Work may be performed individually on a contracting/project basis or as part of a project team and in response to combinations of paper based and electronic instructions.

Unit Sector(s)

Unit sector	Structural steel detailing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATCS504A Detail ancillary steelwork

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the skills and knowledge required to detail steelwork ancillary to, or separate from, the main structural elements and their connections in a steel framed building or industrial construction.

Application of the Unit

Application of the unit	This unit applies to a structural steel detailer who has to detail ancillary structural steelwork including steelwork used in stairways, ladders, landings, platforms for personnel and machinery, and other ancillary steel structures such as cages, lift guide rails and crane rails. The unit can also apply to the detailing of stand alone steel constructions that are not part of or attached to plant or buildings, and which do not require additional specialist knowledge. Examples include: • steel tankage rolled plates • chimney flumes • exhaust pipe flumes • pipe supports • conveyor structures. The unit assumes that knowledge of basic technical drawing conventions and procedures such as view, dimensioning, drawing layout, and so on is already held. Work is conducted according to defined procedures. The detailing covered by this unit may be done manually or by using CAD and/or proprietary steel detailing software. Work may be conducted in small to large scale enterprises and may involve individual and team activities.

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	This unit requires the application of skills associated with planning and organising to complete structural steel detail drawings. Communication and numeracy skills are used to refer to patterns and specifications and complete and label sketches. Self management skills are used to ensure conformance of own work to quality standards.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*MEM09002B*	*Interpret technical drawing*
	MSATCS301A	*Interpret architectural and engineering design specifications for structural steel detailing*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA
1. Detail stairways, platforms, ladders and landings	1.1. Scheduling of detail drawings for stairways, platforms, ladders and landings are discussed with fabricator 1.2. Design information is checked and any requests for further information (RFIs) are made 1.3. Large scale set-out or 3D model of stairway is prepared and setting out points established 1.4. Stairway is dimensioned and detailed consistent with design information and the Building Code of Australia and AS 1657 1.5. Holding down bolt layout and base plate details are prepared for ground floor supports or plinths
2. Detail other ancillary steel structures	2.1. Design information is received from client and fabrication schedule and requirements including allocation of components for shop and site fabrication confirmed 2.2. Size limitations of any sections requiring corrosion treatment or other surface finishing processes are determined 2.3. Transport limitations, erection procedures and limitations, and any relevant codes and regulations are determined 2.4. Rough large scale layout and 3D model is combined with trial assembly if required 2.5. Design information is used to directly insert or calculate and insert all dimensions, clearances, bolt layouts, weld types and dimensions, direction marks and surface finishes on shop drawings and erection diagrams 2.6. Detail drawings are sent for approval by designer

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• assess design information for adequacy of information needed for structural steel detailing

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REQUIRED SKILLS AND KNOWLEDGE
• liaise with architects and engineers • assess scope of structural steel detailing tasks and priorities • interpret design drawings, sketches and schedules • produce shop detail drawings and erection drawings • research and obtain relevant Australian Standards, codes and regulations • work according to OHS practices of the enterprise and workplace which may include requirements prescribed by legislation, awards, agreements and conditions of employment, standard operating procedures, or oral, written or visual instructions • communicate at all levels about technical issues related to patterns and specifications • reading and numeracy is required to the level of interpreting workplace documents and technical information
Required knowledge
• architectural and engineering design drawings including standard symbols, terms, abbreviations and sketches • structural members used in steel constructions • the difference between design and detail drawing processes • drawing office procedures • fabrication processes and procedures • the Australian steel structures limit state design code's (AS4100) requirements in so far as they impact on steel detailing

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge to: • identify and interpret architect and engineer design specifications for structural steel components of ancillary steelwork including members and connections • relate design information to structural steel detailing processes

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EVIDENCE GUIDE	
	• establish efficient administrative arrangements for liaison with designers • establish drawing and document control procedures • identify standard sizes and specifications of structural members and components from industry publications, manufacturers' catalogues and Australian or other relevant standards
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment Resource implications for this unit include: • access to real or appropriately simulated detailing of ancillary structural steelwork including provision of suitable design information • computer with suitable CAD software or manual drafting equipment and material including work areas, materials and equipment • access to steel and component manufacturers catalogues or web sites • access to relevant standards through either hard copy or internet access. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application • Assessment may be applied under project related conditions (real or simulated) and require evidence of process • Assessment must confirm a reasonable inference that

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EVIDENCE GUIDE	
	competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances • Assessment may be in conjunction with assessment of other units of competency where structural steel detailing is involved
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Legislative/regulatory requirements	All work must comply with relevant Federal and State or Territory legislative or regulatory requirements
Design information	Design information is the information provided to the detailer and fabricator by the architects and consulting engineers for a project. For some projects the design information may only be provided by an engineer. The design information will usually be in the form of design drawings or sketches but may also be via material lists, written instructions and computer files
Other ancillary steel structures	Other ancillary structures as defined in this unit are steel constructions that are not part of the structural framework or exterior of a building or part of the structural support for plant and which could be part of a steel construction detailing contract. Examples include: • crane rails and connections

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RANGE STATEMENT	
	• lift guide rails • cages • steel tankage rolled plates • chimney flumes • exhaust pipe flumes • pipe supports • conveyor structures
Direction marks	Direction marks are indicated on the shop drawings and on the beam or girder by the words 'North' or 'West' as applicable. Industry standard practice is to determine the placement of these marks by viewing and numbering the beams and girders from the bottom or right hand edge of the floor plan. Variations from this practice may occur on specific projects and should be noted on the erection plan.
Work environment	Detailing may be undertaken in a variety of work environments including commercial, home office or fabrication or construction enterprise. Work may be performed individually on a contracting/project basis or as part of a project team and in response to combinations of paper based and electronic instructions.

Unit Sector(s)

Unit sector	Structural steel detailing

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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MSATMINS301A Inspect a range of simple measures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to apply National Test Procedures to determine whether simple measures are suitable for trade use. The unit also involves auditing the performance of verifiers who have previously tested and marked simple measures for trade use.

Application of the Unit

Application of the unit	This unit of competency is applicable to trade measurement inspectors appointed under national measurement legislation who may inspect a wide range of simple measures as part of their allocated duties. Simple measures such as trade masses, length measures and volume measures are used in a wide variety of commerce including retail, hospitality, pharmaceuticals and laboratory services. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for inspection	1.1. Identify and evaluate the type of simple measure to be inspected 1.2. Access and review any history of previous inspections at trader's premises 1.3. Access and correctly interpret appropriate documentation required for the inspection 1.4. Identify and access test equipment, products and consumables required for the inspection 1.5. Ensure specified test equipment is fit for purpose in accordance with applicable legislation and organisational procedures 1.6. Store and transport test equipment in accordance with organisational procedures and industry best practice

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ELEMENT	PERFORMANCE CRITERIA
	1.7. Identify workplace health and safety issues relevant to the inspection
2. Initiate inspection	2.1. Identify the site contoller, explain the purpose of the inspection and produce formal identification, if required 2.2. Identify relevant site health and safety issues and implement appropriate control strategies 2.3. Conduct a preliminary evaluation of the site's trading practices and prioritise activities to maximise inspection outcomes 2.4. Identify trade measuring instruments and plan inspection to minimise disruption to the public and trader
3. Evaluate simple measure performance	3.1. Evaluate whether the operating environment will impact on simple measure performance 3.2. Modify the operating environment or implement alternative arrangements to ensure reliable test conditions as necessary 3.3. Identify the maximum permissible errors for the simple measure from the legislative requirements 3.4. Use test equipment safely in accordance with applicable legislation and organisational procedures 3.5. Check simple measure for compliance with the appropriate Certificates of Approval 3.6. Inspect the simple measure in accordance with relevant National Test Procedure and appropriate National Measurement Institute policy 3.7. Evaluate results against prescribed performance criteria and determine if the simple measure is suitable for trade use in accordance with legislative requirements
4. Conduct a verifier performance audit	4.1. Identify the scope of the verifier audit 4.2. Identify the expected outcomes of the verifier audit 4.3. Assess the verifier's performance against the expected outcome 4.4. Analyse any variances from the expected outcomes to identify any isolated or systemic problem
5. Analyse and report inspection results	5.1. Analyse inspection data for unacceptable performance trends 5.2. Display the inspection result on the simple measure in accordance with legislative requirements

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ELEMENT	PERFORMANCE CRITERIA
	5.3. Use test reports to present inspection results in the required format 5.4. Complete inspection documentation in accordance with legislative requirements and organisational procedures 5.5. Communicate inspection results within the specified time and in accordance with organisational guidelines 5.6. Recommend follow-up actions as appropriate
6. Act on non-compliance	6.1. Select applicable enforcement action for the non-compliance in accordance with legislative requirements, organisational policy and procedures 6.2. Inform traders of non-compliances and consequences of failing to have them corrected 6.3. Implement enforcement action in accordance with legislative requirements, organisational policy and procedures 6.4. Maintain the rights of the trader at all times

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- accessing, interpreting and applying a range of documents for the inspection of simple measures including:
  - national measurement legislation
  - routine National Test Procedures
  - Certificates of Approval
  - National Measurement Institute inspection policy
  - Australian Standards
- accessing and interpreting Certificates of Verification for a limited range of reference standards
- use routine communication and negotiation skills to:
  - explain the purpose of inspection
  - inform traders of non-compliances and consequences of failing to rectify them
  - explain procedures and inspection outcomes to traders, verifiers and managers
- accessing, transporting, setting up, validating, using and maintaining a limited

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REQUIRED SKILLS AND KNOWLEDGE
range of test equipment and reference standards • identifying and evaluating environmental impacts on performance of a range of simple measures • conducting tests and recording results with close attention to detail and accuracy • performing calculations involving fractions, decimals, ratios, proportions and percentages • using scientific notation, correct units and the correct number of significant figures • analysing performance results over a single or limited range of operating conditions • identifying non-compliances with national measurement legislation relating to simple measure or verifier performance and initiate appropriate enforcement action including warning, infringement notice, undertaking, injunction and prosecution • identifying potential trading practice non-compliance with national measurement legislation and initiating an appropriate inspection strategy • planning routine tasks • developing/implementing an efficient inspection strategy that has a limited impact on others • demonstrating professionalism and maintaining the rights of the trader at all times • solving routine/expected problems • working safely
Required knowledge

• general chemical and physical principles and concepts including:
  • weight, mass, gravity and density
  • temperature effects and coefficients of expansion
• basic knowledge of the operating procedures across a limited range of environments including laboratories, retail and manufacturing
• knowledge of metrological terms and terminology specific to simple measures such as:
  • maximum permissible errors
  • traceability
  • error of measurement
  • error of indication
• national measurement legislation applicable to simple measures
• detailed knowledge of National Test Procedures and operating procedures for equipment and reference standards used in job role including:
  • purpose of test
  • test conditions and possible environmental impacts on performance of simple measure
  • key preparation/measurement steps in test method
  • calculation steps to give results in appropriate units and precision

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REQUIRED SKILLS AND KNOWLEDGE
• maximum permissible errors for simple measures under inspection • procedures for completing inspection documentation • organisational policy and procedures for inspecting simple measures

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard for any class of simple measures listed in the Range Statement.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify, access and apply test procedures • identify and use suitable reference standards • evaluate and adjust the impact of the operating environment on the performance of simple measures • analyse test results to determine the simple measure's suitability for verification (trade use) • identify the scope of a verifier performance audit and assess results with expected outcomes • audit the performance of verifiers of simple measures • identify and implement additional inspection strategies for non-instrument related breaches of national measurement legislation • recognise and act on non-compliance • maintain the security and confidentiality of data in accordance with organisational and regulatory requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • MSATMREF301A Use and maintain reference standards.

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EVIDENCE GUIDE	
	Resources may include: • simple measures, test equipment and reference standards • computer and relevant software and/or organisation information management system • Certificates of Approval for simple measures • relevant legislative and organisational procedures.
Method of assessment	The following assessment methods are suggested: • questions to assess understanding of relevant procedures, licensing requirements, trader obligations and remedial actions • review of inspection reports and verifier performance audit reports prepared by the candidate • feedback from supervisors and peers regarding the candidate's ability to verify the performance of simple measures in accordance with legislative and organisational procedures • observation of the candidate conducting an inspection. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. An inspector makes an unannounced visit to a manufacturer's premises that packages turpentine, linseed oil, kerosene and methylated spirits. His/her visit identifies that a 5L verified conical measure is being used for trade to check the volume of pre-packaged articles. He/she visually inspects the measure for compliance with the relevant Certificate of Approval and checks the existing certifying marks. The verifier notices that the volume measure is dented. He/she then tests the accuracy of the measure using a suitable 5L reference standard and finds it to be outside the maximum permissible error. He/she notifies the manager of this

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EVIDENCE GUIDE	
	non-compliance and advises that any further use of this measure will result in enforcement action. On returning to their office, the inspector reports the need to inspect the premises and market place for inaccurate pre-packaged items manufactured by the company.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Appropriate documentation	Where reference is made to documentation, it is expected the latest version will be used. Appropriate documentation may include: • reference standards • Certificates of Verification • Certificates of Approval for simple measures • test procedures for verifying simple measures • organisational test reports • organisational procedures e.g. company quality assurance manual • National Measurement Act • occupational health and safety (OHS) regulations, guidelines and procedures and material safety data sheets (MSDS) • equipment manuals and warranty, supplier catalogues, and handbooks • National Measurement Institute policy • Australian Standards
Certificates of Approval	Certificates of Approval may include: • any Certificate issued by the Chief Metrologist under Regulation 60 of the National Measurement Regulations approving the pattern of a simple measure as being suitable

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RANGE STATEMENT	
	for trade
Test equipment	Test equipment may include: • reference standards of measurement • equipment other than reference standards of measurement such as weighing instruments, strikes and funnels
Legislation	Legislation may include: • national measurement legislation • applicable Commonwealth, state and territory OHS legislation
National Test Procedures for simple measures	National Test Procedures for simple measures may include: • length measures • alcoholic beverage measures • lubricating oil measures • graduated measures • pharmaceutical measures • trade masses • any other test procedure prescribed by the National Measurement Institute
OHS and environmental management requirements	OHS and environmental management requirements refers to: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health
Operating environmental impacts	Operating environment impacts may include: • vibration • wind

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RANGE STATEMENT	
	• heat • dust • electromagnetic interference • out of level
Records	Records may include: • test reports • safety procedures • a history of equipment calibration and test results
Simple measures	Inspectors may be required to test and mark any of the classes of simple measures from the following list. Simple measures may include: • length measures • alcoholic beverage measures • lubricating oil measures • graduated measures • pharmaceutical measures • trade masses • any other simple measure prescribed by the National Measurement Institute

Unit Sector(s)

Unit sector	Trade Measurement

Competency field

Competency field	

Co-requisite units

Co-requisite units	

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Co-requisite units		

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MSATMINS302A Inspect a range of simple measuring instruments

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to apply National Test Procedures to determine whether a range of simple measuring instruments are suitable for trade use. The unit also involves auditing the performance of verifiers who have previously tested and marked simple measuring instruments for trade use.

Application of the Unit

Application of the unit	This unit of competency is applicable to trade measurement inspectors appointed under national measurement legislation who may inspect a wide range of simple measuring instruments as part of their allocated duties. Simple measuring instruments are used in a very wide range of commerce. For example, dip sticks are used to measure bulk petroleum products and beverages, dimensional measuring instruments are used to measure the cubic measurements of packages for freight and length/area instruments are used to accurately measure a wide range of articles sold by reference to those measurements. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for inspection	1.1. Identify and evaluate the type of instrument to be inspected 1.2. Access and review any history of previous inspections at trader's premises 1.3. Access and correctly interpret appropriate documentation required for the inspection 1.4. Identify and access test equipment, products and consumables required for the inspection 1.5. Ensure specified test equipment is fit for purpose in accordance with applicable legislation and organisational procedures

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ELEMENT	PERFORMANCE CRITERIA
	1.6. Store and transport test equipment in accordance with organisational procedures and industry best practice 1.7. Identify workplace health and safety issues relevant to the inspection
2. Initiate inspection	2.1. Identify the site contoller, explain the purpose of the inspection and produce formal identification, if required 2.2. Identify relevant site health and safety issues and implement appropriate control strategies 2.3. Conduct a preliminary evaluation of the site's trading practices and prioritise activities to maximise inspection outcomes 2.4. Identify trade measuring instruments and plan inspection to minimise disruption to the public and trader 2.5. Identify locations for product return or disposal, if applicable
3. Evaluate simple measuring instrument performance	3.1. Evaluate whether the operating environment will impact on the instrument performance 3.2. Modify the operating environment or implement alternative arrangements to ensure reliable test conditions as necessary 3.3. Identify the maximum permissible errors for the instrument from the legislative requirements 3.4. Use test equipment safely in accordance with applicable legislation and organisational procedures 3.5. Check instrument for compliance with the appropriate Certificates of Approval 3.6. Inspect the instrument in accordance with relevant National Test Procedure and appropriate National Measurement Institute policy 3.7. Evaluate results against prescribed performance criteria and determine if the instrument is suitable for trade use in accordance with legislative requirements
4. Conduct a verifier performance audit	4.1. Identify the scope of the verifier audit 4.2. Identify the expected outcomes of the verifier audit 4.3. Assess the verifier's performance against the expected outcome 4.4. Analyse any variances from the expected outcomes to identify isolated or systemic problems

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ELEMENT	PERFORMANCE CRITERIA
5. Analyse and report inspection results	5.1. Analyse inspection data for unacceptable performance trends 5.2. Display the inspection result on the instrument in accordance with legislative requirements 5.3. Use test reports to present inspection results in the required format 5.4. Complete inspection documentation in accordance with legislative requirements and organisational procedures 5.5. Communicate inspection results within the specified time and in accordance with organisational guidelines 5.6. Recommend follow-up actions as appropriate.
6. Act on non-compliance	6.1. Select applicable enforcement action for the non-compliance in accordance with legislative requirements, organisational policy and procedures 6.2. Inform traders of non-compliances and consequences of failing to have them corrected 6.3. Implement enforcement action in accordance with legislative requirements, organisational policy and procedures 6.4. Maintain the rights of the trader at all times

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- accessing, interpreting and applying a range of documents for the inspection of simple measuring instruments including:
  - national measurement legislation
  - routine National Test Procedures
  - Certificates of Approval
  - National Measurement Institute inspection policy
  - Australian Standards
- accessing and interpreting Certificates of Verification for a limitedrange of reference standards
- use routine communication and negotiation skills to:

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REQUIRED SKILLS AND KNOWLEDGE

- explain the purpose of inspection
- inform traders of non-compliances and consequences of failing to rectify them
- explain procedures and inspection outcomes to traders, verifiers and managers
- accessing, transporting, setting up, validating, using and maintaining a limited range of test equipment and reference standards
- identifying and evaluating environmental impacts on performance of a range of simple measuring instruments
- conducting tests and recording results with close attention to detail and accuracy
- performing calculations involving fractions, decimals, ratios, proportions and percentages
- using correct units and the correct number of significant figures
- analysing performance results over a single or limited range of operating conditions
- identifying non-compliances with national measurement legislation relating to instrument or verifier performance and initiate appropriate enforcement action including warning, infringement notice, undertaking, injunction and prosecution
- identifying potential trading practice non-compliance with national measurement legislation and initiating an appropriate inspection strategy
- planning routine tasks
- developing/implementing an efficient inspection strategy that has a limited impact on others
- demonstrating professionalism and maintaining the rights of the trader at all times
- solving routine/expected problems
- working safely

Required knowledge

- general chemical and physical principles and concepts including:
  - weight, mass, gravity and density
  - temperature effects and coefficients of expansion
- basic knowledge of the operating procedures across a limited range of environments including laboratories, retail, industrial and farming
- knowledge of metrological terms and terminology specific to simple measuring instruments such as maximum permissible errors and traceability
- national measurement legislation applicable to simple measuring instruments
- detailed knowledge of National Test Procedures and operating procedures for equipment and reference standards used in job role including:
  - purpose of test
  - test conditions and possible environmental impacts on performance of the instrument
  - key preparation/measurement steps in test method
  - calculation steps to give results in appropriate units and precision

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REQUIRED SKILLS AND KNOWLEDGE
• maximum permissible errors for simple measuring instruments under inspection • procedures for completing inspection documentation • organisational policy and procedures for inspecting simple measuring instruments

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard for any class of simple measuring instruments listed in the Range Statement.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify, access and apply test procedures • identify and use suitable reference standards • evaluate and adjust the impact of the operating environment on the performance of the instrument • analyse test results to determine the instrument's suitability for verification (trade use) • identify the scope of a verifier performance audit and assess results with expected outcomes • audit the performance of verifiers of simple measuring instruments • identify and implement additional inspection strategies for non-instrument related breaches of national measurement legislation • recognise and act on non-compliance • maintain the security and confidentiality of data in accordance with organisational and regulatory requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with:

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EVIDENCE GUIDE	
	• MSATMREF301A Use and maintain reference standards. Resources may include: • simple measuring instruments, test equipment and reference standards • computer and relevant software and/or organisation information management system • Certificates of Approval for instruments • relevant legislative and organisational procedures.
Method of assessment	The following assessment methods are suggested: • questions to assess understanding of relevant procedures, licensing requirements, trader obligations and remedial actions • review of inspection reports and verifier performance audit reports prepared by the candidate • feedback from supervisors and peers regarding the candidate's ability to verify the performance of instruments in accordance with legislative and organisational procedures • observation of the candidate conducting an inspection. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. An inspector has been allocated the task of verifying an area measuring instrument at a tannery. In preparation for his/her visit, the inspector accesses the organisation's database to establish the instrument type, site contact details and any previous history for the instrument or trader. The inspector assembles the test equipment required for the inspection. All reference standards are inspected for damage and validity against their certificate prior to them being stowed with the other equipment safely in the vehicle. On arrival at the tannery, the

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EVIDENCE GUIDE	
	inspector introduces him/herself to the manager and explains the purpose of the visit and the process involved. During this discussion, the inspector explains that he/she will inspect the area measuring instrument for compliance with its Certificate of Approval, assess the operating environment for factors that may impact on its performance and conduct visual and performance tests in accordance with the National Test Procedure. If the instrument complies with these requirements it will be marked as being acceptable for trade use. During the subsequent inspection, the area instrument is found to have a capacity greater than what is stated in the Certificate of Approval and the instrument's performance exceeds the maximum permissible error stated in the national measurement regulations. Consequently, the inspector removes the previous verification mark from the instrument and issues the trader with a warning that the instrument cannot be used for trade until it has been corrected and verified again. Before leaving the premises, the inspector provides the trader with some options for rectifying the non-compliances and gives the manager an opportunity to ask any questions about trade measurement activities.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Prescribed performance criteria for instruments	Prescribed performance criteria for instruments may include: • design is in accordance with the appropriate Certificates of Approval • performance meets the criteria described in the Certificates of Approval, National Test Procedure, legislation and National Measurement Institute policy

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RANGE STATEMENT	
Appropriate documentation	Where reference is made to documentation, it is expected the latest version will be used. Appropriate documentation may include: • Certificates of Verification • Certificates of Approval for simple measuring instruments • test procedures for verifying simple measuring instruments • organisational test reports • organisational procedures • National Measurement Act • occupational health and safety (OHS) regulations, guidelines and procedures and material safety data sheets (MSDS) • equipment manuals and warranty, supplier catalogues and handbooks • National Measurement Institute policy • Australian Standards
Certificates of Approval	Certificates of Approval may include: • the Certificate issued under national measurement legislation approving the pattern of a simple measuring instrument as being suitable for trade
Enforcement action	Enforcement action may include: • formal warnings • infringement notice • formal undertaking • injunction • prosecution
Test equipment	Test equipment may include: • reference standards of measurement • equipment other than reference standards of measurement e.g. weighing instrument, funnels, manifolds, hoses, water meters, roman levels, tramells and beakers
Legislation	Legislation may include: • national measurement legislation • applicable Commonwealth, state and territory

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RANGE STATEMENT	
	OHS legislation
National Measurement Institute policy	National Measurement Institute policy may include: • test procedure variations between a verification, in-service or audit inspection • bulletin • instruction • determination
National Test Procedures for simple measuring instruments	National Test Procedures for simple measuring instruments may include those for: • beverage measuring instruments • protein measuring instruments • length measuring instruments • area measuring instruments • dimensional measuring instruments • vehicle tanks • milk tanks • any other test procedure prescribed by the National Measurement Institute
OHS and environmental management requirements	OHS and environmental management requirements refer to: • all operations must comply with enterprise occupational health safety and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health
Operating environmental impacts	Operating environmental impacts may include: • vibration • humidity • temperature • dust

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RANGE STATEMENT	
	• electromagnetic interference • out of level
Records	Records may include: • test reports • audit reports • safety procedures • a history of equipment calibration and test results
Simple measuring instruments	Inspectors may be required to test and mark any of the classes of instruments from the following list. Simple measuring instruments may include: • beverage measuring instruments • protein measuring instruments • length measuring instruments • area measuring instruments • dimensional measuring instruments • vehicle tanks • milk tanks • any other instrument prescribed by the National Measurement Institute
Trading practices	Trading practices may include: • methods used for the sale of goods • advertising • using measuring instruments • position of measuring instruments • environmental factors • suitability of instrument • over-pricing • incorrect measurement
Verification	Verification refers to: • the inspection of an instrument for the purpose of determining if the instrument meets the legislative requirements for trade use

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Unit Sector(s)

Unit sector	Trade Measurement

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATMINS401A Inspect a range of weighing instruments

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to apply National Test Procedures to determine whether a non-automatic weighing instrument (<3 tonne) or catchweigher is suitable for trade and then mark it accordingly. It also involves auditing the performance of verifiers who have previously tested and marked limited weighing instruments for use.

Application of the Unit

Application of the unit	This unit of competency is applicable to trade measurement inspectors appointed under national measurement legislation who may inspect a wide range of limited weighing instruments as part of their allocated duties. For example, electronic weighing instruments are used to measure a wide range of products at the point of sale, as an order or as a pre-packaged article. The range of environments where these instruments is almost limitless. Some examples of these environments includes pharmaceutical laboratories, supermarkets, fresh food retailers, packing houses, chemical/petroleum industry, construction, mining and other extractive industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for inspection	1.1. Identify and evaluate the type of instrument to be inspected 1.2. Access and review any history of previous inspections at trader's premises 1.3. Access and correctly interpret appropriate documentation required for the inspection 1.4. Identify and access test equipment, products and consumables required for the inspection 1.5. Ensure specified test equipment is fit for purpose in accordance with applicable legislation and

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ELEMENT	PERFORMANCE CRITERIA
	organisational procedures 1.6. Store and transport test equipment in accordance with organisational procedures and industry best practice 1.7. Identify workplace health and safety issues relevant to the inspection
2. Initiate inspection	2.1. Identify the site contoller, explain the purpose of the inspection and produce formal identification, if required 2.2. Identify relevant site health and safety issues and implement appropriate control strategies 2.3. Conduct a preliminary evaluation of the site's trading practices and prioritise activities to maximise inspection outcomes. 2.4. Identify trade measuring instruments and plan inspection to minimise disruption to the public and trader
3. Evaluate weighing instrument performance	3.1. Evaluate whether the operating environment will impact on the instrument performance 3.2. Modify the operating environment or implement alternative arrangements to ensure reliable test conditions as necessary 3.3. Identify the maximum permissible errors for the instrument from the legislative requirements 3.4. Use test equipment safely in accordance with applicable legislation and organisational procedures 3.5. Check instrument for compliance with the appropriate Certificates of Approval 3.6. Inspect the instrument in accordance with relevant National Test Procedure and appropriate National Measurement Institute policy 3.7. Evaluate results against prescribed performance criteria and determine if the instrument is suitable for trade use in accordance with legislative requirements
4. Conduct a verifier performance audit	4.1. Identify the scope of the verifier audit 4.2. Identify the expected outcomes of the verifier audit 4.3. Assess the verifier's performance against the expected outcome 4.4. Analyse any variances from the expected outcomes to identify isolated or systemic problems
5. Analyse and report	5.1. Analyse inspection data for unacceptable

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ELEMENT	PERFORMANCE CRITERIA
inspection results	performance trends 5.2. Display the inspection result on the instrument in accordance with legislative requirements 5.3. Use test reports to present inspection results in the required format 5.4. Complete inspection documentation in accordance with legislative requirements and organisational procedures 5.5. Communicate inspection results within the specified time and in accordance with organisational guidelines 5.6. Recommend follow-up actions as appropriate.
6. Act on non-compliance	6.1. Select applicable enforcement action for the non-compliance in accordance with legislative requirements, organisational policy and procedures 6.2. Inform traders of non-compliances and consequences of failing to have them corrected 6.3. Implement enforcement action in accordance with legislative requirements, organisational policy and procedures 6.4. Maintain the rights of the trader at all times

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

• accessing, interpreting and applying a range of documents for the inspection of weighing instruments including:
  • national measurement legislation
  • routine National Test Procedures
  • Certificates of Approval
  • National Measurement Institute inspection policy
  • national and international design rules
  • pattern approval documents
• accessing and interpreting Certificates of Verification for a range of reference standards
• performing inspections over durations of up to one day in routine environments

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REQUIRED SKILLS AND KNOWLEDGE

- using advanced communication and negotiation skills to:
  - explain the purpose of inspection
  - inform traders of non-compliances and consequences of failing to rectify them
  - access external equipment and resources to complete the inspection
  - explain inspection procedures and outcomes to traders, verifiers and managers
- accessing, transporting, setting up, validating, using and maintaining a range of test equipment and reference standards
- identifying and evaluating environmental impacts on performance of a range of weighing instruments
- conducting tests and recording results with close attention to detail and accuracy
- performing calculations involving:
  - fractions, decimals, ratios, proportions and percentages
  - scientific notation, correct units and the correct number of significant figures
  - interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation
- analysing performance results over a number of operating conditions
- identifying non-compliances with national measurement legislation relating to instrument or verifier performance and initiate appropriate enforcement action including warning, infringement notice, undertaking, injunction and prosecution
- identifying potential trading practice non-compliance with national measurement legislation and initiating an appropriate inspection strategy
- planning routine tasks
- developing/implementing an efficient inspection strategy that has a limited impact on traders, the public, employees and suppliers
- demonstrating professionalism and maintaining the rights of the trader at all times
- solving routine/expected problems
- working safely which may include applying basic first aid, confined space entry and working with heavy machinery

Required knowledge

- general chemical and physical principles and concepts including weight, mass and gravity
- knowledge of the operating procedures across a range of environments including laboratories, retail, manufacturing, industrial, mining, construction, medical, chemical, petroleum, farming and abattoirs
- knowledge of metrological terms and terminology specific to weighing instruments such as maximum permissible errors, traceability, uncertainty, maximum permissible difference, eccentricity, repeatability, error of measurement, error of indication and linearisation
- national measurement legislation applicable to weighing instruments
- detailed knowledge of National Test Procedures and operating procedures for equipment and reference standards used in job role including:

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REQUIRED SKILLS AND KNOWLEDGE
• purpose of test • test conditions and possible environmental impacts on performance of the instrument • key preparation/measurement steps in test method • calculation steps to give results in appropriate units and precision • maximum permissible errors for weighing instruments under inspection • procedures for completing inspection documentation • organisational policy and procedures for verifying weighing instruments • safety principles and procedures relevant to instruments and test environment • basic first aid and site safety induction if required

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard for any class of weighing instrument listed in the Range Statement.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify, access and apply test procedures • identify and use suitable reference standards • evaluate and adjust the impact of the operating environment on the performance of the instrument • analyse test results to determine the instrument's suitability for verification (trade use) • identify the scope of a verifier performance audit and assess results with expected outcomes • audit the performance of verifiers of weighing instruments • identify and implement additional inspection strategies for non-instrument related breaches of national measurement legislation • recognise and act on non-compliance • maintain the security and confidentiality of data in accordance with organisational and regulatory

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EVIDENCE GUIDE	
	requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • MSATMREF301A Use and maintain reference standards. Resources may include: • limited weighing instruments, test equipment and reference standards • computer and relevant software and/or organisation information management system • Certificates of Approval for instruments • relevant legislative and organisational procedures.
Method of assessment	The following assessment methods are suggested: • questions to assess understanding of relevant procedures, licensing requirements, trader obligations and remedial actions • review of inspection reports and verifier performance audit reports prepared by the candidate • feedback from supervisors and peers regarding the candidate's ability to verify the performance of instruments in accordance with legislative and organisational procedures • observation of the candidate conducting an inspection. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. An inspector has been allocated a task of verifying a digital weighing instrument at a butcher's premises. In

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EVIDENCE GUIDE	
	preparation for this visit, the inspector accesses the organisation's database to establish the type of instrument to be tested and any previous history of the instrument or trader. The equipment required for this inspection is identified, accessed and stowed in the vehicle securely and safely. Particular attention is made to ensure the integrity of the reference standards is maintained and that they are still current according to their verification certificate. On arrival at the butcher's premises, the inspector introduces him/herself to the manager and explains the purpose of the visit and the process involved. During this discussion the inspector explains that he/she will inspect the instrument for compliance with its Certificate of Approval, assess the instrument's operating environment for factors that may impact on its performance and conduct the visual and performance tests in accordance with the National Test Procedure. If it complies with these requirements, he/she will mark the instrument as being acceptable for trade use and complete all the required inspection documentation. During the inspection the inspector finds that the instrument has a tare capacity greater than that stated in the Certificate of Approval and the weighing performance of the instrument exceeds the maximum permissible error stated in the national measurement regulations. As a result, the inspector removes the previous verification mark from the instrument and issues the butcher a warning that the instrument cannot be used for trade until it has been corrected and verified again. Before leaving the premises, the inspector examines a sample of prepacked articles and the trading practices used by the trader for compliance with trade measurement legislation.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and

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RANGE STATEMENT	
regional contexts) may also be included.	
Prescribed performance criteria for instruments	Prescribed performance criteria for instruments may include: • design is in accordance with the appropriate Certificates of Approval • performance meets the criteria described in the Certificates of Approval, National Test Procedure and legislation
Appropriate documentation	Where reference is made to documentation, it is expected the latest version will be used. Appropriate documentation may include: • reference standards • Certificates of Verification • Certificates of Approval for limited weighing instruments • test procedures for verifying limited weighing instruments • organisational test reports • organisational procedures e.g. company quality assurance manual • National Measurement Act • occupational health and safety (OHS) regulations, guidelines and procedures and material safety data sheets (MSDS) • equipment manuals and warranty, supplier catalogues and handbooks
Certificates of Approval	Certificates of Approval may include: • any Certificate issued by the Chief Metrologist under Regulation 60 of the National Measurement Regulations approving the pattern of a limited weighing instrument as being suitable for trade
Enforcement action	Enforcement action may include: • formal warnings • infringement notice • formal undertaking • injunction • prosecution

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RANGE STATEMENT	
Test equipment	Test equipment may include: • reference standards of measurement
Legislation	Legislation may include: • national measurement legislation • applicable Commonwealth, state and territory OHS legislation
National Measurement Institute policy	National Measurement Institute policy may include: • test procedure variations between a verification, in-service or audit inspection • bulletin • instruction • determination
National Test Procedures for limited weighing instruments	National Test Procedures for limited weighing instruments may include: • non-automatic weighing machines tested without substitution loads • automatic Class Y(a) Catchweighers • automatic Class Y(b) Catchweighers • any other test procedure prescribed by the National Measurement Institute
OHS and environmental management requirements	OHS and environmental management requirements refers to: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health
Operating environmental impacts	Operating environmental impacts may include:

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RANGE STATEMENT	
	• vibration • wind • heat • dust • electromagnetic interference • out of level
Records	Records may include: • test reports • safety procedures • a history of equipment calibration and test results
Weighing instruments	Inspectors may be required to test and mark classes of instruments from the following list. Weighing instruments may include: • non-automatic weighing machines tested without substitution loads • automatic Class Y(a) Catchweighers • automatic Class Y(b) Catchweighers • any other test procedure prescribed by the National Measurement Institute

Unit Sector(s)

Unit sector	Trade Measurement

Competency field

Competency field	

Co-requisite units

Co-requisite units	

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Co-requisite units		

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MSATMINS402A Inspect a range of liquid measuring instruments using volume measures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to apply National Test Procedures to determine whether a liquid measuring instrument using volume measures is suitable for trade and then mark it accordingly. It also involves auditing the performance of verifiers who have previously tested and marked liquid measuring instruments for use.

Application of the Unit

Application of the unit	This unit of competency is applicable to trade measurement inspectors appointed under national measurement legislation who may inspect a wide range of liquid measuring instruments tested using a volume measure as part of their allocated duties. Liquid measuring instruments are used in a very wide range of commerce. For example, petrol bowsers measure fuel at the point of sale and flowmeters are used to measure bulk commodities such as milk, chemicals and petroleum products during production and distribution. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for inspection	1.1. Identify and evaluate the type of instrument to be inspected 1.2. Access and review any history of previous inspections at trader's premises 1.3. Access and correctly interpret appropriate documentation required for the inspection 1.4. Identify and access test equipment, products and consumables required for the inspection 1.5. Ensure specified test equipment is fit for purpose in accordance with applicable legislation and organisational procedures 1.6. Store and transport test equipment in accordance with organisational procedures and industry best practice

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ELEMENT	PERFORMANCE CRITERIA
	1.7. Identify workplace health and safety issues relevant to the inspection
2. Initiate inspection	2.1. Identify the site contoller, explain the purpose of the inspection and produce formal identification, if required 2.2. Identify relevant site health and safety issues and implement appropriate control strategies 2.3. Conduct a preliminary evaluation of the site's trading practices and prioritise activities to maximise inspection outcomes 2.4. Identify trade measuring instruments and plan inspection to minimise disruption to the public and trader
3. Evaluate liquid measuring instrument performance	3.1. Evaluate whether the operating environment will impact on the instrument performance 3.2. Modify the operating environment or implement alternative arrangements to ensure reliable test conditions as necessary 3.3. Identify the maximum permissible errors for the instrument from the legislative requirements 3.4. Use test equipment safely in accordance with applicable legislation and organisational procedures 3.5. Check instrument for compliance with the appropriate Certificates of Approval 3.6. Inspect the instrument in accordance with relevant National Test Procedure and appropriate National Measurement Institute policy 3.7. Evaluate results against prescribed performance criteria and determine if the instrument is suitable for trade use in accordance with legislative requirements
4. Conduct a verifier performance audit	4.1. Identify the scope of the verifier audit 4.2. Identify the expected outcomes of the verifier audit 4.3. Assess the verifier's performance against the expected outcome 4.4. Analyse any variances from the expected outcomes to identify isolated or systemic problems
5. Analyse and report inspection results	5.1. Analyse inspection data for unacceptable performance trends 5.2. Display the inspection result on the instrument in accordance with legislative requirements 5.3. Use test reports to present inspection results in the

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ELEMENT	PERFORMANCE CRITERIA
	required format 5.4. Complete inspection documentation in accordance with legislative requirements and organisational procedures 5.5. Communicate inspection results within the specified time and in accordance with organisational guidelines 5.6. Recommend follow-up actions as appropriate
6. Act on non-compliance	6.1. Select applicable enforcement action for the non-compliance in accordance with legislative requirements, organisational policy and procedures 6.2. Inform traders of non-compliances and consequences of failing to have them corrected 6.3. Implement enforcement action in accordance with legislative requirements, organisational policy and procedures 6.4. Maintain the rights of the trader at all times

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- accessing, interpreting and applying a range of documents for the inspection of liquid measuring instruments including:
  - national measurement legislation
  - intermediate National Test Procedures
  - Certificates of Approval
  - National Measurement Institute inspection policy
  - Australian Standards
  - industry codes of practice
  - correction tables for volume, density and pressure for a range of liquids
  - national and international design rules
  - pattern approval documents
- accessing and interpreting Certificates of Verification for a range of reference standards
- performing inspections over extended durations in non-routine and hazardous environments

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REQUIRED SKILLS AND KNOWLEDGE

- using advanced communication and negotiation skills to:
  - explain purpose of the verification
  - inform traders of non-compliances and consequences of failing to rectify
  - access external equipment and resources to complete the verification
  - explain verification procedures and outcomes to traders, verifiers and managers
- accessing, transporting, setting up, validating, using and maintaining a broad range of test equipment and reference standards
- identifying and evaluating environmental factors that may impact on performance of liquid measuring instruments
- organising large equipment to be dispatched ahead of verification visit
- conducting tests and recording results with close attention to detail and accuracy
- performing calculations involving:
  - fractions, decimals, ratios, proportions and percentages
  - evaluation of formulae containing powers, exponents and logarithms functions
  - use of scientific notation, correct units, correct number of significant figures
  - calculation of uncertainties
  - preparation and interpretation of linear, semi-log and log-log graphs
  - interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation
  - determination of regression line equations, correlation coefficients
  - preparation and interpretation of more complex control charts and frequency distribution plots
- analysing performance results over a broad range of operating conditions
- identifying non-compliances with national measurement legislation relating to instrument or verifier performance and initiate appropriate enforcement action including warning, infringement notice, undertaking, injunction and prosecution
- identifying potential trading practice non-compliance with national measurement legislation and initiating an appropriate inspection strategy
- planning complex tasks
- developing/implementing an efficient verification strategy that minimises disruption to traders, the public, technicians, employees, colleagues and suppliers
- demonstrating professionalism and maintaining the rights of the trader at all times
- solving unexpected problems and non-routine issues
- working safely which may include applying basic first aid, confined space entry, working with hazardous materials, working safely in hazardous environments, working with heavy machinery, Australian Institute of Petroleum (AIP) cold work clearance permit, safety induction and working at heights

Required knowledge

- general chemical and physical principles and concepts including:
  - physical states (solid, liquid gas), weight, mass, gravity and density

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REQUIRED SKILLS AND KNOWLEDGE

- pressure, pressure differential, backpressure and head pressure
- fluid flow
- flashpoint, boiling point and ice point
- viscosity
- temperature effects and coefficients of expansion

- basic knowledge of the design, application and function of components used in liquid measuring instruments
- knowledge of the operating procedures across a range of environments including laboratories, retail, commercial, office, manufacturing, industrial, mining, construction, medical, chemical and petroleum
- knowledge of metrological terms and terminology specific to liquid measuring instruments such as:
  - maximum permissible errors, maximum permissible difference and maximum permissible variation
  - traceability
  - repeatability
  - uncertainty, error of measurement and error of indication
  - meter creep
  - hose dilation
  - temperature correction
  - linearisation
  - gas elimination
- national measurement legislation applicable to liquid measuring instruments
- detailed knowledge of National Test Procedures and operating procedures for equipment and reference standards used in job role including:
  - purpose of test
  - test conditions and possible environmental impacts on performance of the instrument
  - key preparation/measurement steps in test method
  - calculation steps to give results in appropriate units and precision
  - maximum permissible errors for liquid measuring instruments under inspection
- procedures for completing inspection documentation
- organisational policy and procedures for inspecting instruments
- safety principles and procedures relevant to instruments
- basic first aid and site safety induction if required

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard for any class of liquid measuring instrument listed in the Range Statement.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify, access and apply test procedures • identify and use suitable reference standards • evaluate and adjust the impact of the operating environment on the performance of the instrument • analyse test results to determine the instrument's suitability for verification (trade use) • identify the scope of a verifier performance audit and assess results with expected outcomes • audit the performance of verifiers of liquid measuring instruments • identify and implement additional inspection strategies for non-instrument related breaches of national measurement legislation • recognise and act on non-compliance • maintain the security and confidentiality of data in accordance with organisational and regulatory requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • MSATMREF301A Use and maintain reference standards. Resources may include: • liquid measuring instruments using volume measures, test equipment and reference standards • safety equipment • computer and relevant software and/or organisation information management system

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EVIDENCE GUIDE	
	• Certificates of Approval for instruments • relevant legislative and organisational procedures.
Method of assessment	The following assessment methods are suggested: • questions to assess understanding of relevant procedures, licensing requirements, trader obligations and remedial actions • review of inspection reports and verifier performance audit reports prepared by the candidate • feedback from supervisors and peers regarding the candidate's ability to verify the performance of instruments in accordance with legislative and organisational procedures • observation of the candidate conducting an inspection. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. An inspector arrives unannounced at a medium size service station to check the performance of a number of fuel dispensers. After introducing him/herself to the site manager, the inspector explains the purpose of the visit and asks for the location of the fuel return points. The inspector performs a safety check, completes an AIP form, places safety barriers around the work area and then prepares the test equipment and reference standards. There are seven fuel dispensers with a total of 38 hoses. The inspector tests a selection of dispensers visually. The National Test Procedure requires the inspector to dispense fuel into 15L reference measures and then return the fuel to storage. Approximately 90 litres are dispensed per hose. The inspector finds a number of non-compliances on site. Two hoses are dispensing fuel outside the allowable maximum permissible error, one dispenser has a faulty segment in its display and the lights are not working, the diesel dispenser failed the air

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	elimination test and three hoses are badly worn. The inspector removes the verification mark from all non-compliant dispensers. While testing the fuel dispenser, the inspector notices a number of items displayed for sale outside the office. On closer inspection, some of the pre-packaged items are found not to be marked with a measurement statement. The inspector meets with the site manager to inform him of the non-compliant dispensers. He/she advises the manager not to use any unmarked dispensers, explains how they can be rectified and issues non- compliance notices. They also discuss the non-compliant pre-packaged articles. The inspector takes details for further action, completes the AIP form and fuel usage report and then departs.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Prescribed performance criteria for instruments	Prescribed performance criteria for instruments may include: • design is in accordance with the appropriate Certificates of Approval • performance meets the criteria described in the Certificates of Approval, National Test Procedure and legislation
Appropriate documentation	Where reference is made to documentation, it is expected the latest version will be used. Appropriate documentation may include: • reference standards • Certificates of Verification • Certificates of Approval for liquid measuring

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RANGE STATEMENT	
	instruments • test procedures for verifying liquid measuring instruments • organisational test reports • organisational procedures e.g. company quality assurance manual • National Measurement Act • occupational health and safety (OHS) regulations, guidelines and procedures and material safety data sheets (MSDS) • equipment manuals and warranty, supplier catalogues and handbooks
Certificates of Approval	Certificates of Approval may include: • any Certificate issued by the Chief Metrologist under Regulation 60 of the National Measurement Regulations approving the pattern of a liquid measuring instrument as being suitable for trade
Enforcement action	Enforcement action may include: • formal warnings • infringement notice • formal undertaking • injunction • prosecution
Test equipment	Test equipment may include: • reference standards of measurement • equipment other than reference standards of measurement such as pumps, funnels and hoses
Legislation	Legislation may include • national measurement legislation • applicable Commonwealth, state and territory OHS legislation
National Measurement Institute policy	National Measurement Institute policy may include: • test procedure variations between a verification, in-service or audit inspection • bulletin • instruction

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RANGE STATEMENT	
	• determination
National Test Procedures for liquid measuring instruments	National Test Procedures for liquid measuring instruments may include: • fuel dispensers other than LPG dispensers • bulk flowmetering systems for liquid hydrocarbons other than LPG tested using a volume measure • milk flowmeters tested using a volume measure • any other test procedure prescribed by the National Measurement Institute
OHS and environmental management requirements	OHS and environmental management requirements refer to: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health
Operating environmental impacts	Operating environmental impacts may include: • vibration • wind • heat • dust • electromagnetic interference • out of level
Records	Records may include: • test reports • AIP form • safety procedures • a history of equipment calibration and test results

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RANGE STATEMENT	
Liquid measuring instruments	Inspectors may be required to test and mark any of the classes of instruments from the following list. Liquid measuring instruments may include: • fuel dispensers other than LPG dispensers • bulk flowmetering systems for liquid hydrocarbons other than LPG tested using a volume measure • milk flowmeters tested using a volume measure • or any other liquid measuring instrument prescribed by the National Measurement Institute

Unit Sector(s)

Unit sector	Trade Measurement

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATMINS403A Inspect a range of trading practices

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the inspection of trading practices and application of National Test Procedures to determine whether the method of advertising, selling and measuring an article complies with national measurement legislation.

Application of the Unit

Application of the unit	This unit of competency is applicable to trade measurement inspectors appointed under national measurement legislation who may inspect a wide range of trading practices as part of their allocated duties. Compliance with national legislation governing trading practices applies to the measurement and transactions of all products sold by reference to measurement in all industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for inspection	1.1. Identify and evaluate the type of trading practices to be inspected 1.2. Access and review any history of previous inspections at trader's premises 1.3. Access and correctly interpret appropriate documentation required for the inspection 1.4. Identify and access test equipment, investigation equipment and consumables required for the inspection 1.5. Ensure specified test equipment is fit for purpose in accordance with applicable legislation and organisational procedures 1.6. Store and transport test equipment in accordance with organisational procedures and industry best practice 1.7. Identify workplace health and safety issues relevant

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ELEMENT	PERFORMANCE CRITERIA
	to the inspection
2. Conduct a trial purchase	2.1. Observe and assess visible trading practices prior to entry into the premises 2.2. Identify scope and expected outcomes of the trial purchase 2.3. On entry to the premises, evaluate trading practices and where applicable modify trial purchase strategy to maximise inspection outcomes 2.4. Conduct trial purchase while observing the measurement process and staff actions 2.5. Assess trader's performance against expected outcomes 2.6. Analyse any variances from the expected outcomes and identify isolated or systemic issues related to the trial purchase
3. Initiate inspection	3.1. Identify the site contoller, explain the purpose of the inspection and produce formal identification, if required 3.2. Identify site workplace health and safety issues and implement appropriate control strategies 3.3. Conduct a preliminary evaluation of the site's trade measurement activities and prioritise inspection to maximise outcomes 3.4. Identify measuring instruments being used for trade 3.5. Identify site's trading practice activities and plan inspection to minimise disruption to the public and trader
4. Examine measurement related advertising for compliance	4.1. Identify the articles which are required to be sold by specific measurement or in terms of a measurement at base conditions 4.2. Inspect and evaluate measurement related advertising used by the trader 4.3. Identify any non-compliances with legislative requirements
5. Examine trade measuring instrument operation	5.1. Inspect measuring instrument operating environment and determine instrument suitability for purpose 5.2. Evaluate measuring instrument operation against legislative requirements, organisational policy and procedures 5.3. Modify the operating environment or implement alternative arrangements to ensure reliable test

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ELEMENT	PERFORMANCE CRITERIA
	conditions, as necessary 5.4. Identify the maximum permissible errors for the instrument from the legislative requirements 5.5. Use test equipment safely in accordance with applicable legislation and organisational procedures 5.6. Check instrument for compliance with the appropriate Certificates of Approval 5.7. Inspect the instrument in accordance with relevant National Test Procedure and appropriate National Measurement Institute policy 5.8. Evaluate results against prescribed performance criteria and determine if the instrument is suitable for trade use in accordance with legislative requirements
6. Validate the measurement of articles	6.1. Identify articles sold by reference to measurement 6.2. Examine the process used by the trader for measuring an article 6.3. Evaluate the trader's measurement procedure 6.4. Measure an article in accordance with the appropriate National Test Procedure, organisational policy and procedures
7. Analyse and report inspection results	7.1. Analyse inspection data for unacceptable trends 7.2. Use test reports to present inspection results in the required format 7.3. Complete inspection documentation in accordance with legislative requirements and organisational procedures 7.4. Communicate inspection results within the specified time and in accordance with organisational guidelines 7.5. Recommend follow-up actions as appropriate
8. Act on non-compliance	8.1. Record and collect evidence of any identified non-compliance in accordance with legislative requirements, organisational policy and procedures 8.2. Select applicable enforcement action for the non-compliance in accordance with legislative requirements, organisational policy and procedures 8.3. Inform trader of non-compliances and the consequences of failing to have them corrected 8.4. Implement enforcement action in accordance with legislative requirements, organisational policy and procedures

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ELEMENT	PERFORMANCE CRITERIA
	8.5. Maintain the rights of the trader at all times

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

• accessing, interpreting and applying a range of documents for the inspection of trading practices including:
  • national measurement legislation
  • National Test Procedures
  • National Measurement Institute inspection policy
• accessing and interpreting Certificates of Verification for a range of reference standards
• performing inspections over a wide range of environments
• using advanced communication and negotiation skills to:
  • explain the purpose of inspection
  • inform traders of non-compliances and consequences of failing to rectify them
  • access external equipment and resources to complete the inspection
  • explain inspection procedures and outcomes to tradersand managers
• accessing, transporting, setting up, validating, using and maintaining a range of test equipment and reference standards
• identifying and evaluating environmental impacts on performance of a range of measuring instruments
• identifying and evaluating impacts of trader procedures on the measurement of articles
• conducting tests and recording results with close attention to detail and accuracy
• performing calculations involving:
  • fractions, decimals, ratios, proportions and percentages
  • scientific notation, correct units and the correct number of significant figures
  • interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation
• identifying non-compliances with national measurement legislation relating to trading practices and initiate appropriate enforcement action including warning, infringement notice, undertaking, injunction and prosecution
• identifying potential measuring instrument non-compliance with national measurement legislation and initiating an appropriate inspection strategy

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REQUIRED SKILLS AND KNOWLEDGE
• planning routine tasks • developing/implementing an efficient inspection strategy that has a limited impact on traders, the public, employees and suppliers • demonstrating professionalism and maintaining the rights of the trader at all times • solving routine/expected problems • working safely which may include applying basic first aid
Required knowledge

• general physical principles and concepts including weight, mass, gravity, volume, length and area
• knowledge of the operating procedures across a range of retail environments and some industrial and petroleum environments
• knowledge of metrological terms and terminology such as maximum permissible errors, traceability and uncertainty
• national measurement legislation applicable to trading practices and measuring instruments
• detailed knowledge of National Test Procedures and operating procedures for equipment and reference standards used in job role including:
  • purpose of test
  • test conditions and possible environmental impacts on performance of the instrument
  • key preparation/measurement steps in test method
  • calculation steps to give results in appropriate units and precision
  • maximum permissible errors for measuring instruments under inspection
• procedures for completing inspection documentation
• organisational policy and procedures for inspecting trading practices
• safety principles and procedures relevant to instruments and test environment
• basic first aid and site safety induction if required

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard while inspecting any of the trading practices listed in the Range

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EVIDENCE GUIDE	
	Statement.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify, access and apply test procedures • identify and use suitable reference standards • evaluate and adjust the impact of the operating environment on the performance of the instrument • analyse test results to determine the instrument's suitability for verification (trade use) • identify and implement additional inspection strategies for non-trading practice related breaches of national measurement legislation • recognise and act on non-compliance • maintain the security and confidentiality of data in accordance with organisational and regulatory requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • MSATMINS404A Inspect a range of pre-packaged products • MSATMINS301A Inspect a range of simple measures • MSATMINS302A Inspect a range of simple measuring instruments • MSATMINS401A Inspect a range of weighing instruments • MSATMINS402A Inspect a range of liquid measuring instruments using volume measures. Resources may include: • measuring instruments, test equipment and reference standards • computer and relevant software and/or organisation information management system • Certificates of Approval for instruments • relevant legislative and organisational procedures.
Method of assessment	The following assessment methods are suggested: • questions to assess understanding of relevant

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EVIDENCE GUIDE	
	procedures, trader obligations and remedial actions • review of inspection reports prepared by the candidate • feedback from supervisors and peers regarding the candidate's ability to inspect trading practices in accordance with legislative and organisational procedures • observation of the candidate conducting a trading practice inspection. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. An inspector is allocated a file to investigate a consumer complaint alleging that a butcher is over charging on purchases of meat. During preparation for the inspection, the inspector notices that the trader was recently issued with an infringement notice for a similar offence. On arrival at the premises, the inspector observes the trading practices visible from outside the premises and develops a trial purchase plan. On entry, the inspector inspects the shop layout, staff actions, operation of the scales, advertising and the method of selling meat. He/she observes some cuts of meat are not being advertised and sold by weight as required by national measurement legislation and eye fillet is being advertised for sale at a price per 100 g without a reference to its price per kilogram. The inspector modifies the purchase plan to include an additional purchase of meat not apparently being sold by weight. The inspector conducts the trial purchase of two separate cuts of meat. The first cut of meat is weighed on a scale that indicates 0.050 kg without anything on the weigh platter. The second cut is being sold for a set price per item. After paying for the meat, the inspector identifies the site controller, introduces him/herself, explains a trial purchase had been completed and the process for the

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EVIDENCE GUIDE	
	remainder of the inspection. The inspector weighs the first cut of meat on the same scale used by the butcher during the trial purchase. Before weighing the meat, he/she resets the scale to zero and finds the meat weighs 0.050 kg less than the weight he/she was charged for. The pre-packaged products being offered for sale are found to be correct weight and correctly marked as required by legislation. The inspector records notes of the trial purchase in his/her notebook, then tests the accuracy of the weighing instruments and notes that the scales had been verified last month. Before leaving the premises, the inspector informs the site controller of the non-compliances: i.e. selling an article with a short fall, using a weighing instrument incorrectly, selling meat other than by reference to its weight and not advertising meat for sale at a price per kilogram. He/she outlines the resulting enforcement actions and consequences for failing to correct the non-compliances. On returning to the office, the inspector disposes of the trial purchase, files his/her notes and photographs as evidence of the non-compliance and reports the inspection outcomes in accordance with organisational policy and procedures.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Appropriate documentation	Where reference is made to documentation, it is expected the latest version will be used. Appropriate documentation may include: • reference standards • Certificates of Verification

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RANGE STATEMENT	
	• measuring instrument Certificates of Approval • test procedures for measuring instruments • organisational test reports • organisational procedures e.g. company quality assurance manual • National Measurement Act • occupational health and safety (OHS) regulations, guidelines and procedures material safety data sheets • equipment manuals and warranty, supplier catalogues and handbooks
Certificates of Approval	Certificates of Approval may include: • any Certificate issued by the Chief Metrologist under Regulation 60 of the National Measurement Regulations approving the pattern of a limited weighing instrument as being suitable for trade
Enforcement action	Enforcement action may include: • formal warnings • infringement notice • formal undertaking • injunction • prosecution
Test equipment	Test equipment may include: • reference standards of measurement • weighing instruments • trolleys • cameras • video and audio recorders
Legislation	Legislation may include: • national measurement legislation • applicable Commonwealth, state and territory OHS legislation
National Measurement Institute policy	• National Measurement Institute policy may include: • test procedure variations between a verification, in-service or audit inspection • bulletin • instruction

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RANGE STATEMENT	
	• determination • policy documents
National Test Procedures	National Test Procedures may include: • measuring instrument test procedures • article measurement procedures • any other test procedure prescribed by the National Measurement Institute
OHS and environmental management requirements	OHS and environmental management requirements refer to: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health
Operating environmental impacts	Operating environmental impacts may include: • vibration • wind • heat • dust • electromagnetic interference • out of level • liquid being measured
Records	Records may include: • test reports • safety procedures • a history of equipment calibration and test results
Trading practices	Trading practices may include: • how a measuring instrument is used • position of measuring instruments

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RANGE STATEMENT	
	• measurement advertising • how the measurement of an article is determined • the type of measurement used to sell an article • the base conditions at which the measurement of an article is determined

Unit Sector(s)

Unit sector	Trade Measurement

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATMINS404A Inspect a range of pre-packaged products

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the inspection of pre-packaged products by inspectors to determine whether the marking and measurement requirements of the packaged article comply with national measurement legislation.

Application of the Unit

Application of the unit	This unit of competency is applicable to trade measurement inspectors appointed under national measurement legislation who may inspect a wide range of pre-packaged products as part of their allocated duties. Compliance with national legislation governing pre-packaged products applies to the accuracy of the labelling information and contents of all items parcelled for sale in all industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for inspection	1.1. Identify and evaluate the type of pre-packaged products to be inspected 1.2. Access and review any history of previous inspections at trader's premises 1.3. Access and correctly interpret appropriate documentation required for the inspection 1.4. Identify and access test equipment, investigation equipment and consumables required for the inspection 1.5. Ensure specified test equipment is fit for purpose in accordance with applicable legislation and organisational procedures 1.6. Store and transport test equipment in accordance with organisational procedures and industry best

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ELEMENT	PERFORMANCE CRITERIA
	practice 1.7. Identify workplace health and safety issues relevant to the inspection
2. Initiate inspection	2.1. Identify the site contoller, explain the purpose of the inspection and produce formal identification, if required 2.2. Identify site workplace health and safety issues and implement appropriate control strategies 2.3. Conduct a preliminary evaluation of the site's trade measurement activities and prioritise inspection to maximise outcomes 2.4. Identify the range of pre-packaged products at the premises and plan the inspection to achieve maximum outcomes while minimising disruption to the public and trader
3. Inspect packaged article markings	3.1. Identify generic trade measurement marking requirements for pre-packaged products 3.2. Identify specific trade measurement marking requirements related to the pre-packaged product selected for inspection 3.3. Assess measurement, unit pricing and packer identification markings on pre-packaged products for compliance with legislative requirements
4. Measure the net contents of pre-packaged products	4.1. Identify and access National Test Procedure appropriate for measuring the product 4.2. Select pre-packaged products for measurement in accordance with marketplace intelligence, legislative requirements, organisational policy and procedures 4.3. Identify, access and apply product handling and disposal requirements in accordance with workplace, health and safety and environmental requiements 4.4. Select specialised equipment, reference standards and measuring devices in accordance with organisational policy and procedures 4.5. Measure pre-packaged product in accordance with the appropriate National Test Procedure, organisational policy and procedures 4.6. Evaluate results against prescribed performance criteria and determine if the net contents of the individual pre-packaged products and inspection lot meet legislative requirements
5. Evaluate trader's	5.1. Examine the process used by the trader to measure a

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ELEMENT	PERFORMANCE CRITERIA
measurement process	pre-packaged product 5.2. Evaluate the effectiveness of the trader's measurement procedure, methodology and test frequency against inspection outcomes 5.3. Inspect measuring instrument operating environment and assess suitability for purpose 5.4. Evaluate measuring instrument operation against legislative requirements, organisational policy and procedures 5.5. Modify the operating environment or implement alternative arrangements to ensure reliable operating conditions for the measuring instrument as necessary 5.6. Identify the maximum permissible errors for the instrument from the legislative requirements 5.7. Inspect measuring instruments in accordance with relevant National Test Procedure, organisational policy and procedures
6. Analyse and report inspection results	6.1. Analyse inspection data for unacceptable trends 6.2. Use test reports to present inspection results in the required format 6.3. Complete inspection documentation in accordance with legislative requirements and organisational procedures 6.4. Communicate inspection results within the specified time and in accordance with organisational guidelines 6.5. Recommend follow-up actions as appropriate
7. Act on non-compliance	7.1. Record and collect evidence of any identified non-compliance in accordance with legislative requirements, organisational policy and procedures 7.2. Select applicable enforcement action for the non-compliance in accordance with legislative requirements, organisational policy and procedures 7.3. Inform traders of non-compliances and consequences of failing to have them corrected 7.4. Implement enforcement action in accordance with legislative requirements, organisational policy and procedures 7.5. Maintain the rights of the trader at all times

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- accessing, interpreting and applying a range of documents for the inspection of pre-packaged products including:
  - national measurement legislation
  - National Test Procedures
  - National Measurement Institute inspection policy
- accessing and interpreting Certificates of Verification for a range of reference standards
- performing inspections over durations exceeding one day in non-routine environments
- using advanced communication and negotiation skills to:
  - explain the purpose of inspection
  - inform traders of non-compliances and consequences of failing to rectify them
  - access external equipment and resources to complete the inspection
  - explain inspection procedures and outcomes to traders, verifiers and managers
- accessing, transporting, setting up, validating, using and maintaining a range of test equipment and reference standards
- identifying and evaluating environmental impacts on performance of a range of measuring instruments
- identifying and evaluating impacts of trader procedures on the measurement of pre-packaged products
- evaluating pre-packaged product markings for compliance with legislative requirements
- conducting tests and recording results with close attention to detail and accuracy
- performing calculations involving:
  - fractions, decimals, ratios, proportions and percentages
  - scientific notation, correct units and the correct number of significant figures
  - interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation
- identifying non-compliances with national measurement legislation relating to trading practices and measuring instruments
- initiating appropriate enforcement action for non-compliances including warning, infringement notice, undertaking, injunction and prosecution
- planning routine tasks
- developing/implementing an efficient inspection strategy that has a limited impact on traders, the public, employees and suppliers
- demonstrating professionalism and maintaining the rights of the trader at all times

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REQUIRED SKILLS AND KNOWLEDGE
• solving routine/expected problems • working safely which may include applying basic first aid
Required knowledge

• general physical principles and concepts including weight, mass, gravity, volume, length, area and displacement
• knowledge of the operating procedures across a range of environments including laboratories, retail, manufacturing, industrial, chemical, petroleum, farming, abattoirs and food processsing
• knowledge of metrological terms and terminology such as maximum permissible errors, traceability, uncertainty, inspection lot, deficiency and shortfall
• national measurement legislation applicable to pre-packaged products and measuring instruments
• detailed knowledge of National Test Procedures and operating procedures for equipment and reference standards used in job role including:
  • purpose of test
  • test conditions and possible environmental impacts on performance of the instrument
  • key preparation/measurement steps in test method
  • calculation steps to give results in appropriate units and precision
  • maximum permissible errors for weighing instruments under inspection
• procedures for completing inspection documentation
• organisational policy and procedures for inspecting pre-packaged products
• safety principles and procedures relevant to instruments and test environment
• basic first aid and site safety induction if required

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard for a wide range of pre-packaged products.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify, access and apply test procedures

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EVIDENCE GUIDE	
	• identify and use suitable reference standards • evaluate and adjust the impact of the operating environment on the performance of the instrument • analyse test results to determine the instrument's suitability for verification (trade use) • inspect markings and net contents of pre-packaged articles • identify and implement additional inspection strategies for pre-packaged product related breaches of national measurement legislation • recognise and act on non-compliance • maintain the security and confidentiality of data in accordance with organisational and regulatory requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • MSATMINS403AA Inspect a range of trading practices • MSATMINS301A Inspect a range of simple measures • MSATMINS302A Inspect a range of simple measuring instruments • MSATMINS401A Inspect a range of weighing instruments • MSATMINS402A Inspect a range of liquid measuring instruments using volume measures. Resources may include: • measuring instruments, test equipment and reference standards • computer and relevant software and/or organisation information management system • Certificates of Approval for instruments • relevant legislative and organisational procedures.
Method of assessment	The following assessment methods are suggested: • questions to assess understanding of relevant procedures, trader obligations and remedial actions • review of inspection reports prepared by the

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EVIDENCE GUIDE	
	candidate • feedback from supervisors and peers regarding the candidate's ability to inspect pre-packaged products in accordance with legislative and organisational procedures • observation of the candidate inspecting pre-packaged products. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. An inspector is allocated a routine inspection at a factory which packs milk. When reviewing the trader's inspection history, the inspector notices that the trader was issued with an infringement notice 12 months ago for packing 2 L bottles of milk that had an average 4.5% shortfall.On arrival at the premises, the inspector enters the main office and explains the purpose of the visit. While waiting for the site controller to arrive, the inspector assesses the business registration documents on public display and notes they coincide with the pre-inspection documentation he/she retrieved earlier. When the site controller arrives, the inspector explains the purpose of the visit.The site controller provides a site induction and highlights the local workplace health and safety requirements. The inspector then outlines an inspection strategy that will minimise disruption to the trader and suppliers and satisfy the factory's health and hygiene requirements. The inspector collects the necessary equipment and documentation from his/her vehicle and validates the test equipment before proceeding with the inspection. Given the trader's history, he/she selects an inspection lot of 12 pre-packaged 2 L bottles of milk. On close examination, the inspector finds that the measurement and packer identification markings on this product do not comply with legislative requirements because the 2 L print height

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EVIDENCE GUIDE	
	is too small.He/she then measures the volume of milk in each bottle and finds an average shortfall of 75 ml or 3.75%. The inspector conducts a detailed investigation of the trader's milk packaging process, measuring instruments, measurement procedure, and their methodology and frequency of measurement tests. He/she finds that the milk density used for setting volumetric fillers is incorrect and causing the shortfall. Before leaving the premises, the inspector informs the site controller of the non-compliances: i.e. packing pre-packaged products with an average shortfall which exceeded the prescribed performance criteria and a measurement marking print height smaller than the prescribed criteria. He/she outlines the resulting enforcement actions and consequences for failing to correct the non-compliances. On returning to the office, the inspector files his/her notes, test reports and photographs as evidence of the non-compliance and reports the inspection outcomes in accordance with organisational policy and procedures.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Appropriate documentation	Where reference is made to documentation, it is expected the latest version will be used. Appropriate documentation may include: • reference standards • Certificates of Verification • measuring instrument Certificates of Approval • test procedures for inspecting pre-packaged products and measuring instruments • organisational test reports

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RANGE STATEMENT	
	• organisational procedures e.g. company quality assurance manual • National Measurement Act • occupational health and safety (OHS) regulations, guidelines and procedures material safety data sheets • equipment manuals and warranty, supplier catalogues and handbooks
Certificates of Approval	Certificates of Approval may include: • any Certificate issued by the Chief Metrologist under Regulation 60 of the National Measurement Regulations approving the pattern of a measuring instrument as being suitable for trade
Enforcement action	Enforcement action may include: • formal warnings • infringement notice • formal undertaking • injunction • prosecution
Test equipment	Test equipment may include: • reference standards of measurement • weighing instruments • trolleys • cameras • video and audio recorders
Legislation	Legislation may include: • national measurement legislation • applicable Commonwealth, state and territory OHS legislation
National Measurement Institute policy	National Measurement Institute policy may include: • test procedure variations between a verification, in-service or audit inspection • bulletin • instruction • determination • policy documents

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RANGE STATEMENT	
National Test Procedures	National Test Procedures may include: • measuring instrument test procedures • article measurement procedures • any other test procedure prescribed by the National Measurement Institute
OHS and environmental management requirements	OHS and environmental management requirements refer to: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health
Operating environmental impacts	Operating environmental impacts may include: • vibration • wind • heat • dust • electromagnetic interference • out of level • liquid being measured
Records	Records may include: • test reports • safety procedures • a history of equipment calibration and test results

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Unit Sector(s)

Unit sector	Trade Measurement

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATMINS501A Inspect a range of complex measuring instruments

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to apply National Test Procedures to determine whether a complex measuring instrument is suitable for trade use. It involves the ability to perform lengthy calculations to assess instrument performance and conduct tests that may require coordination of a range of resources over long durations in hazardous environments. This unit also involves auditing the performance of verifiers who have previously tested and marked instruments for use.

Application of the Unit

Application of the unit	This unit of competency is applicable to trade measurement inspectors appointed under national measurement legislation who may inspect a range of complex measuring instruments as part of their allocated duties. Complex measuring instruments are used in a wide range of heavy industries. For example, automatic rail weighbridges, belt weighers, totalising hoppers and liquid petroleum gas (LPG) flow meters are used throughout the mining, road/rail freight and petroleum/gas industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for inspection	1.1. Identify and evaluate the type of instrument to be inspected 1.2. Access and correctly interpret documentation required for the inspection 1.3. Identify and access test equipment, products and consumables required for the inspection 1.4. Ensure test equipment is suitable for its purpose in accordance with applicable legislation and organisational procedures 1.5. Store and transport equipment in accordance with

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ELEMENT	PERFORMANCE CRITERIA
	organisational procedures and industry best practice 1.6. Access and evaluate any previous test results for the trader 1.7. Identify workplace health and safety issues relevant to the inspection 1.8. Develop an inspection strategy to maximise resources and minimise time required for complex tests
2. Liaise with the trader to schedule complex tests	2.1. Discuss inspection arrangements with site controller where applicable 2.2. Identify relevant local workplace, health and safety issues and implement appropriate control strategies 2.3. Discuss the inspection strategy with the trader to minimise its impact on the trader's normal operations 2.4. Arrange site clearances and suitable scheduling for tests 2.5. Negotiate access to trader's equipment, materials and support personnel required for testing to be available on site 2.6. Arrange for any equipment to be provided by the trader, if required, by the National Test Procedure
3. Initiate inspection	3.1. Identify the site contoller, explain/review the purpose of the inspection and, if required, produce formal identification 3.2. Review inspection strategy to ensure there is minimal disruption to the public and/or trader 3.3. Communicate inspection strategy to all personnel involved 3.4. Identify locations for product return or disposal if applicable 3.5. Evaluate the impacts of the operating environment on the instrument performance or test results and, where applicable, implement corrective actions 3.6. Identify operational factors impacting on instrument performance or test result and, where applicable, implement corrective actions
4. Evaluate complex measuring instrument performance	4.1. Identify the maximum permissible errors for the instrument from the legislative requirements 4.2. Manage and review resources to maintain inspection timelines 4.3. Provide effective communication to ensure relevant

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ELEMENT	PERFORMANCE CRITERIA
	personnel are informed of variations to the inspection strategy and inspection progress 4.4. Check instrument for compliance with the appropriate Certificates of Approval 4.5. Inspect the instrument in accordance with relevant National Test Procedure and appropriate National Measurement Institute policy
5. Analyse inspection results	5.1. Perform specified calculations to determine a performance result for the instrument with appropriate accuracy, precision and significant figures 5.2. Use graphical and statistical analysis to determine unknowns as necessary 5.3. Ensure calculations are consistent with estimations and reasonable expectations 5.4. Evaluate results against prescribed performance criteria and determine if the instrument is suitable for trade use in accordance with legislative requirements
6. Conduct a verifier performance audit	6.1. Identify the scope of the verifier audit 6.2. Identify the expected outcomes of the verifier audit 6.3. Assess the verifier's performance against the expected outcome 6.4. Analyse any variances from the expected outcomes to identify any isolated or systemic problems
7. Report inspection results	7.1. Display the inspection result on the instrument in accordance with legislative requirements 7.2. Use test reports to present inspection results in the required format 7.3. Complete inspection documentation in accordance with legislative requirements and organisational procedures 7.4. Communicate inspection results within the specified time and in accordance with organisational guidelines 7.5. Recommend follow-up actions as appropriate.
8. Act on non-compliance	8.1. Select applicable enforcement action for the non-compliance in accordance with legislative requirements, organisational policy and procedures 8.2. Inform traders of non-compliances and consequences of failing to have them corrected 8.3. Implement enforcement action in accordance with legislative requirements, organisational policy and

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ELEMENT	PERFORMANCE CRITERIA
	procedures 8.4. Maintain the rights of the trader at all times

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills

• accessing, interpreting and applying a range of documents for the inspection of complex measuring instruments including:
  • national measurement legislation
  • intermediate National Test Procedures
  • Certificates of Approval
  • National Measurement Institute inspection policy
  • Australian Standards
  • industry codes of practice
  • correction tables for volume, density and pressure for a range of liquids
  • national and international design rules
  • pattern approval documents
• accessing and interpreting Certificates of Verification for a wide range of reference standards
• performing inspection over extended durations up to five days in non-routine and hazardous environments
• using advanced communication and negotiation skills to:
  • explain purpose of the inspection
  • inform traders of non-compliances and consequences of failing to rectify
  • access external equipment and resources to complete the inspection
• explain inspection procedures and outcomes to traders, verifiers and managers
• accessing, transporting, setting up, validating, using and maintaining a broad range of test equipment and reference standards
• identifying and evaluating environmental factors that may impact on performance of complex measuring instruments
• organising large equipment to be dispatched ahead of inspection visit
• conducting lengthy tests and recording results with close attention to detail and accuracy
• performing complex calculations involving:

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REQUIRED SKILLS AND KNOWLEDGE

- fractions, decimals, ratios, proportions and percentages
- evaluation of formulae containing powers, exponents and logarithms functions
- use of scientific notation, correct units and correct number of significant figures
- calculation of uncertainties
- preparation and interpretation of linear, semi-log and log-log graphs
- interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation
- determination of regression line equations and correlation coefficients
- preparation and interpretation of more complex control charts and frequency distribution plots

- analysing performance results over a broad range of operating conditions
- identifying non-compliances with national measurement legislation relating to instrument or verifier performance and initiate appropriate enforcement action including warning, infringement notice, undertaking, injunction and prosecution
- identifying potential trading practice non-compliance with national measurement legislation and initiating an appropriate inspection strategy
- planning complex tasks
- developing/implementing an efficient inspection strategy that minimises disruption to traders, the public, technicians, contractors, employees, colleagues and suppliers
- demonstrating professionalism and maintaining the rights of the trader at all times
- solving unexpected problems and non-routine issues
- working safely which may include applying basic first aid, confined space entry, working with hazardous materials, working safely in hazardous environments, working with heavy machinery, Australian Institute of Petroleum (AIP) cold work clearance permit, safety induction, working at heights and biosecurity issues

Required knowledge

- general chemical and physical principles and concepts including:
  - physical states (solid, liquid gas), weight, mass, gravity and density
  - pressure, pressure differential, backpressure and head pressure
  - fluid flow
  - flashpoint, boiling point and ice point
  - viscosity
  - temperature effects and coefficients of expansion
- basic knowledge of the design, application and function of components used in complex measuring instruments
- knowledge of the operating procedures across a range of environments including laboratories, retail, commercial, office, manufacturing, industrial, mining, construction, medical, chemical, petroleum, farming and abattoirs
- knowledge of metrological terms and terminology specific to complex measuring instruments such as:

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REQUIRED SKILLS AND KNOWLEDGE
• maximum permissible errors, maximum permissible difference and maximum permissible variation • traceability • repeatability • uncertainty, error of measurement and error of indication • meter creep • hose dilation • temperature correction • linearisation • gas elimination • national measurement legislation applicable to complex measuring instruments • detailed knowledge of National Test Procedures and operating procedures for equipment and reference standards used in job role including: • purpose of test • test conditions and possible environmental impacts on performance of the instrument • key preparation/measurement steps in test method • calculation steps to give results in appropriate units and precision • maximum permissible errors for complex measuring instruments under inspection • procedures for completing inspection documentation • organisational policy and procedures for inspecting instruments • safety principles and procedures relevant to instruments • basic first aid and site safety induction if required

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard for any class of complex instrument listed in the Range Statement.
Critical aspects for assessment and evidence required to demonstrate	Assessors should ensure that candidates can:

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EVIDENCE GUIDE	
competency in this unit	• identify, access and apply test procedures • identify and use suitable reference standards • evaluate and adjust the impact of the operating environment on the performance of the instrument • analyse test results to determine the instrument's suitability for verification (trade use) • identify the scope of a verifier performance audit and assess results with expected outcomes • audit the performance of verifiers of complex measuring instruments • identify and implement additional inspection strategies for non-instrument related breaches of national measurement legislation • recognise and act on non-compliance • maintain the security and confidentiality of data in accordance with organisational and regulatory requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • MSATMREF301A Use and maintain reference standards. Resources may include: • access to a complex instrument, test equipment and reference standards • computer and relevant software and/or organisation information management system • Certificates of Approval for the instrument • relevant legislative and organisational procedures.
Method of assessment	The following assessment methods are suggested: • questions to assess understanding of relevant procedures, licensing requirements, trader obligations and remedial actions • review of inspection reports and verifier performance audit reports prepared by the candidate • feedback from supervisors and peers regarding the candidate's ability to inspect the performance of instruments in accordance with legislative and organisational procedures

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EVIDENCE GUIDE	
	• observation of the candidate conducting an inspection. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. An inspector has been given the task of inspecting a bulk flowmetering system at an oil company distribution terminal. In preparation, the inspector evaluates the instrument nominated for inspection, identifies and accesses appropriate documentation for the inspection, identifies and accesses equipment, evaluates previous inspection data and develops an inspection strategy.The inspector visits the terminal to discuss the proposed inspection strategy with the site controller. During this discussion, the inspector discovers that access to the instrument has been restricted and modifications will have to be made to the area surrounding the instrument. The site controller engages a contractor to make the necessary modifications and agrees on an inspection strategy that will minimise disruption to terminal operations. On completion of the modifications, the inspector returns to the terminal to inspect the bulk flowmetering system. The site controller has arranged for all the resources identified at the inspection strategy meeting to be available. Prior to commencing any testing, the inspector holds a meeting with all personnel involved in the inspection and describes the inspection strategy. A fitter who will be operating the instrument identifies a problem and offers a solution. The inspector agrees and adjusts the inspection strategy accordingly.At the completion of the testing, the inspector uses the recorded data in combination with a variety of data derived from correction tables and complex mathematical formulae to determine performance result for the instrument.These results confirm the instrument's performance is outside

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EVIDENCE GUIDE	
	the acceptable maximum permissible errors. The inspector informs the site controller of the outcome and issues a formal warning explaining that the instrument cannot be used for trade until it has been corrected and verified by a licensed verifier.During a follow up visit, the inspector confirms the instrument has been repaired and verifies it.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Prescribed performance criteria for instruments	Prescribed performance criteria for instruments may include: • design is in accordance with the appropriate Certificates of Approval • performance meets the criteria described in the Certificates of Approval, National Test Procedure and legislation
Appropriate documentation	Where reference is made to documentation, it is expected the latest version will be used. Appropriate documentation may include: • reference standards • Certificates of Verification • Certificates of Approval for complex instruments • test procedures for verifying complex instruments • organisational test reports • organisational procedures e.g. company quality assurance manual • National Measurement Act • occupational health and safety (OHS)

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RANGE STATEMENT	
	regulations, guidelines and procedures material data safety sheets • equipment manuals and warranty, supplier catalogues and handbooks
Certificates of Approval	Certificates of Approval may include: • any Certificate issued under the National Measurement Regulations approving the pattern of a complex measuring instrument as being suitable for trade
Enforcement action	Enforcement action may include: • formal warnings • infringement notice • formal undertaking • injunction • prosecution
Test equipment	Test equipment may include: • reference standards of measurement • equipment other than reference standards of measurement such as weighing instruments, pumping units, control instruments, two way communication, hoses, fittings, rail wagons, trains and tankers • LPG cylinders
Legislation may include	Legislation may include: • national measurement legislation • applicable Commonwealth, state and territory OHS legislation
National Measurement Institute policy	National Measurement Institute policy may include: • test procedure variations between a verification, in-service or audit inspection • bulletin • instruction • determination
National Test Procedures for complex instruments	National Test Procedures for complex instruments may include: • non-automatic weighing machines >3 tonne • LPG dispensers

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RANGE STATEMENT	
	• bulk LPG flowmetering systems • flowmetering systems tested using the master meter or gravimetric methods • automatic rail weighbridges • continuous totalising automatic weighing instruments (belt weighers) • totalising hopper weighing instruments • any other test procedure prescribed by the National Measurement Institute
OHS and environmental management requirements	OHS and environmental management requirements refer to: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health
Operating environmental impacts	Operating environmental impacts may include: • vibration • wind • heat • dust • electromagnetic interference • out of level
Specified calculations	Specified calculations may include: • calculations involving fractions, decimals, ratios, proportions and percentages • evaluation of formulae containing powers, exponents and logarithms functions • use of scientific notation, correct units and correct number of significant figures • calculation of uncertainties • preparation and interpretation of linear,

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RANGE STATEMENT	
	semi-log and log-log graphs • calculation and interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation • determination of regression line equations and correlation coefficients • preparation and interpretation of more complex control charts and frequency distribution plots
Records	Records may include: • test reports • safety procedures • a history of equipment calibration and test results
Complex instruments	Inspectors may be required to test and mark any of the classes of instruments from the following list. Complex instruments may include: • non-automatic weighing machines >3 tonne • LPG dispensers • LPG bulk flowmetering systems • flowmetering systems tested using master meter or gravimetric methods • automatic rail weighbridges • continuous totalising automatic weighing instruments (belt weighers) • totalising hoppers weighing instruments • any other complex measuring instrument prescribed by the National Measurement Institute

Unit Sector(s)

Unit sector	Trade Measurement

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATMREF301A Use and maintain reference standards

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to select and use appropriate reference standards of measurement in accordance with standard procedures and industry best practice. It also involves storing and transporting reference standards correctly and maintaining their integrity during all trade measurement activities.

Application of the Unit

Application of the unit	This unit of competency is applicable to: • trade measurement inspectors appointed under national measurement legislation who may use reference standards of measurement for inspecting a range of pre-packaged products, trading practices or measuring instruments as part of their allocated duties • verifiers who operate under a servicing licence to install and/or repair, test and mark specific classes of trade measuring instruments. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Maintain reference standard integrity	1.1. Identify environmental issues that may impact on reference standard integrity and implement appropriate control strategies 1.2. Store, transport and handle reference standards in accordance with organisational procedures and industry best practice 1.3. Quarantine and report damaged or compromised reference standards in accordance with organisational procedures 1.4. Plan and organise reference standard maintenance and calibration in accordance with legislative requirements and organisational procedures 1.5. Update maintenance and calibration records in accordance with organisational procedures

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ELEMENT	PERFORMANCE CRITERIA
	1.6. Ensure that personnel assisting with the activity use correct handling procedures for reference standards
2. Select appropriate reference standards	2.1. Identify the scope and expected outcomes of the planned activity 2.2. Identify and access reference standards appropriate to the activity 2.3. Evaluate reference standard limitations associated with the activity and operating environment 2.4. Validate reference standard suitability against the activity scope and expected outcomes in accordance with legislative requirements and organisational policy and procedures
3. Use reference standards	3.1. Review the expected outcomes for the activity 3.2. Access and interpret reference standard Certificates of Verification and measurement reports 3.3. Condition the reference standard as required to produce consistent and accurate measurements 3.4. Identify, interpret and apply reference standard corrections as required 3.5. Assess the results of the activity against the prescribed performance criteria 3.6. Analyse any variances from the expected outcomes to identify any isolated or systemic problems linked to the reference standard or its use
4. Maintain a safe work environment	4.1. Use established safe work practices and personal protective equipment to ensure personal safety and that of other personnel 4.2. Identify relevant local workplace, health and safety issues and implement appropriate control strategies 4.3. Handle reference standards safely in accordance with applicable legislation and organisational procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE

- using correct documentation to obtain information about tolerances for reference standards
- identifying suitable reference standardsfor the planned activity
- accessing documented operating procedures for reference standards and test equipment
- using reference standards and test equipment in accordance with specified procedures
- calibrating/maintaining reference standards and test equipment
- maintaining accuracy and currency of maintenance register for reference standards
- identifying and recording/reporting malfunction of, or damage to, reference standards or test equipment
- interpreting Certificates of Verification in relation to the use of reference standards
- using graphs and tables within Certificates of Verification
- accessing and interpreting Certificates of Verification for a range of reference standards
- using a wide range of reference standards over a wide range of environments
- using advanced communication and negotiation skills to:
  - explain the purpose of the trade measurement activity
  - access external equipment and resources to complete the activity
  - explain procedures and expected outcomes of the activity to tradersand managers
- accessing, transporting, setting up, validating, using and maintaining a range of test equipment and reference standards
- identifying and evaluating environmental impacts on a wide range of reference standards
- performing calculations involving:
  - fractions, decimals, ratios, proportions and percentages
  - scientific notation, correct units and the correct number of significant figures
  - interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation
- organising large reference standards to be dispatched ahead of visit to trader's premises
- planning routine tasks
- demonstrating professionalism and maintaining the rights of the trader at all times
- solving routine/expected problems
- working safely which may include applying basic first aid, confined space entry and working with heavy machinery

Required knowledge

- general physical principles and concepts including weight, mass, gravity, density, volume, length and area

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REQUIRED SKILLS AND KNOWLEDGE

- Australian legal units of measurement
- organisations involved in legal metrology in Australia
- hierarchy of reference standards in relation to legal metrology
- purpose of Certificates of Verification issued under the national measurement legislation
- metrological terms such as: maximum permissible errors, maximum permissible variations, traceability, uncertainty
- information in graphs and tables within Certificates
- application of different classes of reference standards used to inspect/verify trade measurement instruments
- transport/storage specifications and procedures for test/specialised equipment and reference standards
- variations from transport/storage specifications and procedures requiring appropriate approval
- maintenance and calibration procedures for reference standards used in job role
- maintenance required for test equipment when manufacturer's requirements are unavailable
- actions to be taken where legal traceability can not be confirmed
- actions to be taken if reference standards and test equipment are found to be defective
- procedures for recording and reporting faults
- maintenance requirements for reference standards and test equipment
- knowledge of the operating procedures across a range of environments such as laboratories, retail, commercial, office, manufacturing, industrial, mining, construction, medical, chemical, petroleum, farming and abattoirs
- detailed knowledge of National Test Procedures and operating procedures for equipment and reference standards used in job role including:
  - purpose of test
  - test conditions and possible environmental impacts on performance of the instrument
  - key preparation/measurement steps in test method
  - calculation steps to give results in appropriate units and precision
  - maximum permissible errors for instruments under test
- workplace, health and safety requirements relating to personnel, reference standards, measuring instruments and test equipment
- basic first aid and site safety induction if required

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard using reference standards relevant to job role.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify, access and apply relevant test procedures • select and use suitable reference standards • maintain the integrity of reference standards during their transport, storage and use • determine whether reference standards are defective • validate the suitability of reference standards for activities relevant to job role • maintain the security and confidentiality of data in accordance with organisational and regulatory requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with the following units: • MSATM units dealing with the inspection or verification of trade measurement instruments and inspection of trading practices and pre-packaged products. Resources may include: • reference standards • computer and relevant software and/or organisation information management system • Certificates of Verification • relevant legislative and organisational procedures.
Method of assessment	The following assessment methods are suggested: • questions to assess understanding of relevant procedures, trader obligations and remedial actions • review of maintenance records prepared or

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EVIDENCE GUIDE	
	maintained by the candidate • feedback from supervisors and peers regarding the candidate's ability to use and maintain reference standards in accordance with legislative and organisation's procedures • observation of the candidate using and maintaining reference standards to complete trade measurement activities. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **An inspector** is allocated a routine inspection of a hardware store. In preparation, the inspector locates the trader's file and notes that the company sells a variety of items by measurement using scales, rulers and volume measures. Using the organisation's checklist for inspecting this type of business, he/she identifies the reference standards and documentation required for the inspection. He/she confirms that the selected reference standards are suitable for the intended purpose, are currently verified and are not damaged before stowing them safely in his/her vehicle for transport to the hardware store. On arrival, the inspector meets the site controller and initiates the inspection in accordance with the organisation's standard procedures. The inspector collects the reference standards, test equipment and documentation from the vehicle. The standards include: masses to test a weighing instrument, a volume measure to test a 5 L measure for selling kerosene, a measure of length to test packages of rope, a density bottle to determine the density of turpentine for checking packages and a thermometer to measure the temperature of the density bottle and make appropriate temperature corrections. Before using the reference standards, the inspector confirms the expected outcomes for each activity, reviews the Certificates of Verification and conditions the volume reference standards as required.

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	After each activity, the inspector assesses the results against the prescribed performance criteria and analyses any variances from the expected outcomes to identify any problems that may be linked to the reference standard or its use. At the end of the visit, the inspector cleans the reference standards, returns them to the vehicle and re-stows them safely to maintain their integrity. On returning to the office, the inspector books the masses into the measurement standards laboratory for calibration as their Certificate of Verification is due to expire in 22 days. **A verifier** is contacted by a local service station to repair and verify two of their fuel dispensers that had been recently rejected for trade use by an inspector. Before proceeding to the service station, the verifier asks the trader some questions and establishes that one fuel dispenser has a flow rate of <60 L/min and another has a flow rate >60 L/min. The verifier consults the National Test Procedure for fuel dispensers and identifies that he/she needs both a 15 L and 200 L volume reference standard to complete this work. In preparation for the visit, the verifier checks whether the reference standards are suitable, they have a current Verification Certificate and are not damaged. This examination reveals that the Certificate for the 200 L reference standard he/she intends to use has expired. He/she immediately books the measure into the measurement standards laboratory for calibration and arranges for a replacement measure with a current Certificate. Before travelling to the service station, the verifier stores the reference standards in the vehicle in accordance with standard operating procedures. On arrival, the verifier takes the time to introduce him/herself to the site controller, complete a site safety induction and outline a test strategy that is both safe and will cause minimal disruption to the trader. The verifier collects the reference standards, test equipment and documentation from the vehicle. Before using the volume measures, he/she reviews their respective Certificates of Verification and notes that there are different drainage requirements for each measure. After repairing the fuel dispensers, the verifier tests the fuel dispensers in accordance with the appropriate National Test Procedure. He/she makes sure to use the volume reference standards

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EVIDENCE GUIDE	
	in a manner that is consistent with the requirements set out in the Certificate of Verification and the organisation's procedures to maintain the integrity of the measurements. After completing the repairs and testing, the verifier cleans the reference standards and re-stows them in the vehicle.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Appropriate documentation	Where reference is made to documentation, it is expected the latest version will be used. Appropriate documentation may include: • reference standard Certificates of Verification • test procedures for inspecting measuring instruments, pre-packaged products and trading practices • organisational test reports • organisational procedures e.g. company quality assurance manual • National Measurement Act • occupational health and safety (OHS) regulations, guidelines and procedures material data safety sheets • equipment manuals and warranty, supplier catalogues and handbooks
Legislation	Legislation may include: • national measurement legislation • applicable Commonwealth, state and territory OHS legislation
National Measurement Institute	National Measurement Institute policy may

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RANGE STATEMENT	
policy	include: • storage and maintenance procedures for reference standards • bulletin • instruction • determination • policy documents
National Test Procedures	National Test Procedures may include: • measuring instrument test procedures • article measurement procedures • or any other test procedure prescribed by the National Measurement Institute
OHS and environmental management requirements	OHS and environmental management requirements refer to: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health
Operating environmental impacts	Operating environmental impacts may include: • vibration • wind • heat • dust • liquid being measured
Records	Records may include: • test reports • safety procedures • a history of equipment calibration and test results

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Unit Sector(s)

Unit sector	Trade Measurement

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATMVER301A Verify simple measures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to apply National Test Procedures to determine whether a class of simple measures is suitable for trade and then mark it accordingly. It also involves the installation and/or repair of simple measures.

Application of the Unit

Application of the unit	This unit of competency is applicable to verifiers operating under a licence to test and mark specific classes of simple measures. Simple measures such as trade masses, length measures and volume measures are used in a wide variety of commerce including retail, hospitality, pharmaceuticals and laboratory services. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Install and repair simple measures	1.1. Access and correctly interpret information for installing or repairing simple measures 1.2. Select required components, tools and equipment in accordance with manufacturer/component supplier specifications 1.3. Perform installation or repair in accordance with legislation, industry codes of practice and organisational guidelines 1.4. Avoid damage to simple measures during installation or repair
2. Prepare for verification	2.1. Identify and evaluate the type of simple measure to be verified 2.2. Access and correctly interpret documentation required for the verification 2.3. Identify and access test equipment, products and

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ELEMENT	PERFORMANCE CRITERIA
	consumables required for the verification 2.4. Liaise with the trader to provide the items required on site 2.5. Ensure specified test equipment is fit for purpose in accordance with applicable legislation and organisational procedures 2.6. Store and transport test equipment in accordance with organisational procedures and industry best practice 2.7. Identify relevant local workplace health and safety issues and implement appropriate control strategies
3. Evaluate simple measure performance	3.1. Evaluate whether the operating environment will impact on the performance of the simple measure 3.2. Modify the operating environment or implement alternative arrangements to ensure reliable test conditions as necessary 3.3. Identify the maximum permissible errors for the simple measure from the legislative requirements 3.4. Use test equipment safely in accordance with applicable legislation and organisational procedures 3.5. Check simple measure for compliance with the appropriate Certificates of Approval 3.6. Inspect simple measure in accordance with relevant National Test Procedure and appropriate National Measurement Institute policy 3.7. Evaluate results against prescribed performance criteria and determine if the simple measure is suitable for trade use in accordance with legislative requirements
4. Report verification results	4.1. Display the verification result on the simple measure in accordance with legislative requirements 4.2. Use test reports to present verification results in the required format 4.3. Complete verification documentation in accordance with legislative requirements and organisational procedures 4.4. Communicate results within the specified time and in accordance with organisational guidelines
5. Model and encourage compliance with statutory	5.1. Apply organisation's procedures and practices to meet licensing authority's requirements 5.2. Clarify any issues about licensing requirements with

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ELEMENT	PERFORMANCE CRITERIA
requirements	the licensing authority as they arise 5.3. Review work and seek feedback from others to confirm continuing compliance with licensing requirements 5.4. Identify implications of non-compliance with licensing requirements 5.5. Identify inadequacies in trader's procedures and practices which may contribute to non-compliance with licensing requirements and/or national measurement legislation 5.6. Explain inadequacies and possible remedial actions to trader
6. Maintain statutory records	6.1. Keep accurate and complete records in accordance with licensing requirements 6.2. Ensure authorisation, training and relevant licences are current in accordance with organisational and licensing requirements 6.3. Inform the licensing administering authority of changes to personal information as required by statute

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- diagnosing faults in simple measures
- installing and repairing simple measures
- accessing, interpreting and applying a range of documents for the verification of simple measures:
  - national measurement legislation
  - routine National Test Procedures
  - Certificates of Approval
  - National Measurement Institute verification policy
  - Australian Standards
- accessing and interpreting Certificates of Verification for a limited range of reference standards

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REQUIRED SKILLS AND KNOWLEDGE

- using routine communication and negotiation skills to:
  - explain the purpose of verification
  - inform traders of non-compliances and consequences of failing to rectify them
  - explain verification procedures and outcomes to traders and managers
- accessing, transporting, setting up, validating, using and maintaining a limited range of test equipment and reference standards
- identifying and evaluating environmental impacts on performance of a range of simple measuring instruments
- conducting tests and recording results with close attention to detail and accuracy
- performing calculations involving fractions, decimals, ratios, proportions and percentages
- using correct units and the correct number of significant figures
- analysing performance results over a single or limited range of operating conditions
- planning routine tasks
- developing/implementing an efficient verification strategy that has a limited impact on others
- demonstrating professionalism and maintaining the rights of the trader at all times
- solving routine/expected problems
- working safely

Required knowledge

- design and functions of components used in simple measures
- licensing requirements for a verifier including:
  - quality management system
  - licence conditions
  - maintenance of statutory records
- general chemical and physic principles and concepts including:
  - weight, mass, gravity and density
  - temperature effects and coefficients of expansion
- basic knowledge of the operating procedures across a limited range of environments including laboratories, retail and manufacturing
- knowledge of metrological terms and terminology specific to simple measuring instruments such as:
  - maximum permissible errors
  - traceability, error of measurement
  - error of indication
- national measurement legislation applicable to simple measures
- detailed knowledge of National Test Procedures and operating procedures for equipment and reference standards used in job role including:

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REQUIRED SKILLS AND KNOWLEDGE
• purpose of test • test conditions and possible environmental impacts on performance of simple measure • key preparation/measurement steps in test method • calculation steps to give results in appropriate units and precision • maximum permissible errors for simple measures under test • procedures for completing verification documentation • organisational policy and procedures for verifying simple measures

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard for one class of simple measures listed in the Range Statement.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify, access and apply test procedures • identify and use suitable reference standards • install and repair simple measures to meet statutory requirements • evaluate and adjust the impact of the operating environment on the performance of simple measures • analyse test results to determine the simple measure's suitability for verification (trade use) • maintain the security and confidentiality of data in accordance with organisational and regulatory requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • MSATMREF301A Use and maintain reference standards.

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EVIDENCE GUIDE	
	Resources may include: • simple measures, test equipment and reference standards • computer and relevant software and/or organisation information management system • Certificates of Approval for simple measures • relevant legislative and organisational procedures.
Method of assessment	The following assessment methods are suggested: • questions to assess understanding of relevant procedures and remedial actions • review of verification reports prepared by the candidate • feedback from supervisors and peers regarding the candidate's ability to verify the performance of simple measures in accordance with legislative and organisational procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. Following an invitation from the trader, a verifier arrives at a millinery shop to verify a one metre rule set in the counter. After introducing him/herself, the verifier outlines the verification procedure and relevant certified reference standard. He/she visually inspects the rule to ensure that it complies with the relevant Certificate of Approval. He/she then conducts the required comparisons between the one metre rule and certified standard in accordance with the National Measurement Institute National Test Procedure. The verifier decides that the measure can be verified and marks the rule with the appropriate certification mark. He/she prepares the Certificate of Verification and presents it to the trader along with an invoice for the work undertaken. On the way out, the verifier notices another rule set into another

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EVIDENCE GUIDE	
	counter. After examining it, he/she decides that the rule does not comply with the Certificate of Approval and advises the trader that it cannot be used for trade.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Prescribed performance criteria for simple measures	Prescribed performance criteria for simple measures may include: • design is in accordance with the appropriate Certificates of Approval • performance meets the criteria described in the Certificates of Approval, National Test Procedure and legislation
Appropriate documentation	Where reference is made to documentation, it is expected the latest version will be used. Appropriate documentation may include: • reference standards • Certificates of Verification • Certificates of Approval for simple measures • test procedures for verifying simple measures • organisational test reports • organisational procedures e.g. company quality assurance manual • National Measurement Act • occupational health and safety (OHS) regulations, guidelines and procedures and material safety data sheets (MSDS) • equipment manuals and warranty, supplier catalogues and handbooks • National Measurement Institute policy • Australian Standards

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RANGE STATEMENT	
Certificates of Approval	Certificates of Approval may include: • any Certificate issued by the Chief Metrologist under Regulation 60 of the National Measurement Regulations approving the pattern of a simple measure as being suitable for trade
Equipment	Equipment may include: • reference standards of measurement • equipment other than reference standards of measurement such as weighing instruments, strikes and funnels
Legislation	Legislation may include: • national measurement legislation • applicable Commonwealth, state and territory OHS legislation
National Test Procedures for simple measures	National Test Procedures for simple measures may include: • length measures • alcoholic beverage measures • lubricating oil measures • graduated measures • pharmaceutical measures • trade masses • any other test procedure prescribed by the National Measurement Institute
OHS and environmental management requirements	OHS and environmental management requirements refers to: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and

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RANGE STATEMENT	
	Territory Departments of Health
Operating environmental impacts	Operating environmental impacts may include: • vibration • wind • heat • dust • electromagnetic interference • out of level
Records	Records may include: • test reports • safety procedures • a history of equipment calibration and test results
Simple measures	Verifiers may be licensed to test and mark specific classes of simple measures from the following list. Simple measures may include: • length measures • alcoholic beverage measures • lubricating oil measures • graduated measures • pharmaceutical measures • trade masses • any other instrument prescribed by the National Measurement Institute

Unit Sector(s)

Unit sector	Trade Measurement

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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MSATMVER302A Verify a simple measuring instrument

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to apply National Test Procedures to determine whether a simple measuring instrument is suitable for trade and then mark it accordingly. It also involves the installation and/or repair of simple measuring instruments.

Application of the Unit

Application of the unit	This unit of competency is applicable to verifiers who operate under a licence to test and mark a specific class of simple measuring instruments. Simple measuring instruments are used in a very wide range of commerce. For example, dip sticks are used to measure bulk petroleum products and beverages, dimensional measuring instruments are used to determine cubic measurements of packages for freight and length/area instruments are used to measure a wide range of articles sold by reference to those measurements. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Install and repair simple measuring instruments	1.1. Access and correctly interpret information for installing or repairing instruments 1.2. Select required components, tools and equipment in accordance with manufacturer/component supplier specifications 1.3. Perform installation or repair in accordance with legislation, industry codes of practice and organisational guidelines 1.4. Avoid instrument damage during installation or repair
2. Prepare for verification	2.1. Identify and evaluate the type of instrument to be verified 2.2. Access and correctly interpret documentation required for the verification

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Identify and access test equipment, products and consumables required for the verification 2.4. Liaise with the trader to provide the items required on site 2.5. Ensure specified test equipment is fit for purpose in accordance with applicable legislation and organisational procedures 2.6. Store and transport test equipment in accordance with organisational procedures and industry best practice 2.7. Identify relevant local workplace health and safety issues and implement appropriate control strategies
3. Evaluate simple measuring instrument performance	3.1. Evaluate whether the operating environment will impact on the instrument performance 3.2. Modify the operating environment or implement alternative arrangements to ensure reliable test conditions as necessary 3.3. Identify the maximum permissible errors for the instrument from the legislative requirements 3.4. Use test equipment safely in accordance with applicable legislation and organisational procedures 3.5. Check instrument for compliance with the appropriate Certificates of Approval 3.6. Inspect the instrument in accordance with relevant National Test Procedure and appropriate National Measurement Institute policy 3.7. Evaluate results against prescribed performance criteria and determine if the instrument is suitable for trade use in accordance with legislative requirements
4. Report verification results	4.1. Display the verification result on the instrument in accordance with legislative requirements 4.2. Use test reports to present verification results in the required format 4.3. Complete verification documentation in accordance with legislative requirements and organisational procedures 4.4. Communicate results within the specified time and in accordance with organisational guidelines
5. Model and encourage compliance with statutory	5.1. Apply organisation's procedures and practices to meet licensing authority's requirements 5.2. Clarify any issues about licensing requirements with

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ELEMENT	PERFORMANCE CRITERIA
requirements	the licensing authority as they arise 5.3. Review work and seek feedback from others to confirm continuing compliance with licensing requirements 5.4. Identify implications of non-compliance with licensing requirements 5.5. Identify inadequacies in trader's procedures and practices which may contribute to non-compliance with licensing requirements and/or national measurement legislation 5.6. Explain inadequacies and possible remedial actions to trader
6. Maintain statutory records	6.1. Keep accurate and complete records in accordance with licensing requirements 6.2. Ensure authorisation, training and relevant licences are current in accordance with organisational and licensing requirements 6.3. Inform the licensing administering authority of changes to personal information as required by statute

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- diagnosing faults in simple measuring instruments
- installing and repairing measuring instruments with a basic design
- accessing, interpreting and applying a range of documents for the verification of simple measuring instruments including:
  - national measurement legislation
  - routine National Test Procedures
  - Certificates of Approval
  - National Measurement Institute verification policy
  - Australian Standards
- accessing and interpreting Certificates of Verification for a limited range of reference standards

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REQUIRED SKILLS AND KNOWLEDGE

- using routine communication and negotiation skills to:
  - explain the purpose of verification
  - inform traders of non-compliances and consequences of failing to rectify them
  - explain verification procedures and outcomes to tradersand managers
- accessing, transporting, setting up, validating, using and maintaining a limited range of test equipment and reference standards
- identifying and evaluating environmental impacts on performance of a range of simple measuring instruments
- conducting tests and recording results with close attention to detail and accuracy
- performing calculations involving fractions, decimals, ratios, proportions and percentages
- using correct units and the correct number of significant figures
- analysing performance results over a single or limited range of operating conditions
- planning routine tasks
- developing/implement an efficient verification strategy that has a limited impact on others
- demonstrating professionalism and maintaining the rights of the trader at all times
- solving routine/expected problems
- working safely

Required knowledge

- design, major components and functions for relevant simple measuring instruments
- licensing requirements for a verifier including:
  - quality management system
  - licence conditions
  - maintenance of statutory records
- general chemical and physical principles and concepts including:
  - weight, mass, gravity and density
  - temperature effects and coefficients of expansion
- basic knowledge of the operating procedures across a limited range of environments includinglaboratories, retail, industrial and farming
- knowledge of metrological terms and terminology specific to simple measuring instruments such as maximum permissible errors and traceability
- national measurement legislation applicable to simple measuring instruments
- detailed knowledge of National Test Procedures and operating procedures for equipment and reference standards used in job role including:
  - purpose of test
  - test conditions and possible environmental impacts on performance of the instrument
  - key preparation/measurement steps in test method

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REQUIRED SKILLS AND KNOWLEDGE
• calculation steps to give results in appropriate units and precision • maximum permissible errors for simple measuring instruments under test • procedures for completing verification documentation • organisational policy and procedures for verifying simple measuring instruments

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard for one class of simple measuring instruments listed in the Range Statement.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify, access and apply test procedures • identify and use suitable reference standards • install and repair measuring instruments to meet statutory requirements • evaluate and adjust the impact of the operating environment on the performance of the instrument • analyse test results to determine the instrument's suitability for verification (trade use) • maintain the security and confidentiality of data in accordance with organisational and regulatory requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • MSATMREF301A Use and maintain reference standards. Resources may include: • simple measuring instruments, test equipment and

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EVIDENCE GUIDE	
	reference standards • computer and relevant software and/or organisation information management system • Certificates of Approval for simple measuring instruments • relevant legislative and organisational procedures.
Method of assessment	The following assessment methods are suggested: • questions to assess understanding of relevant procedures and remedial actions • review of verification reports prepared by the candidate • feedback from supervisors and peers regarding the candidate's ability to verify the performance of instruments in accordance with legislative and organisational procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. A local hotel tests their spirit measuring instruments once a month to ensure they comply with the relevant trade measurement legislation. These tests reveal two of the remote storage spirit measuring instruments are giving short measure to their customers. The publican contacts a verifier, explains the situation and asks if he/she can repair them today. When the verifier asks the publican if he is still using the instruments, he responds 'yes'. The verifier advises the publican that he should immediately stop using the two instruments to avoid being fined for using an incorrect instrument by national Trade Measurement.The verifier arrives that afternoon and discusses the problem in more detail with the publican. During this discussion, the verifier explains what he/she will be doing and confirms that he will maintain the highest standards of hygiene when working with the spirits.The verifier conducts a preliminary test on the

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EVIDENCE GUIDE	
	incorrect instruments and confirms the publican's results. After making adjustments to rectify their inaccuracy, the verifier assesses the instruments design against the Certificate of Approval and completes a full test in accordance with the nationally recognised National Test Procedures. As all results are now within the maximum permissible errors, the verifier marks the instruments with a certification mark and completes a certification form. Before leaving the hotel, the verifier explains to the publican that he/she has completed the work and is now leaving the hotel. The verifier submits the relevant forms to national Trade Measurement within the specified 14 days.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Prescribed performance criteria for **instruments**	Prescribed performance criteria for instruments may include: • design is in accordance with the appropriate Certificates of Approval • performance meets the criteria described in the Certificates of Approval, National Test Procedure and legislation
Appropriate documentation	Where reference is made to documentation, it is expected the latest version will be used. Appropriate documentation may include: • Certificates of Verification • Certificates of Approval for simple measuring instruments • test procedures for verifying simple measuring instruments • organisational test reports

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RANGE STATEMENT	
	• organisational procedures e.g. company quality assurance manual • National Measurement Act • occupational health and safety (OHS) regulations, guidelines and procedures and material safety data sheets (MSDS) • equipment manuals and warranty, supplier catalogues and handbooks • National Measurement Institute policy • Australian Standards
Certificates of Approval	Certificates of Approval may include: • the Certificate issued under national measurement legislation approving the pattern of a simple measuring instrument as being suitable for trade
Test equipment	Test equipment may include: • reference standards of measurement • equipment other than reference standards of measurement such as weighing instruments, strikes, funnels, water meters, beakers, roman levels, tramells and pocket length comparator
Legislation	Legislation may include: • national measurement legislation • applicable Commonwealth, state and territory OHS legislation
National Measurement Institute policy	National Measurement Institute policy may include: • accepted test procedure variations • bulletin • instruction • determination
National Test Procedures for simple measuring instruments	National Test Procedures for simple measuring instruments may include: • beverage measuring instruments • protein measuring instruments • length measuring instruments • area measuring instruments • dimensional measuring instruments

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RANGE STATEMENT	
	• vehicle tanks • milk tanks • any other test procedure prescribed by the National Measurement Institute
OHS and environmental management requirements	OHS and environmental management requirements refer to: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health
Operating environmental impacts	Operating environmental impacts may include: • vibration • temperature • humidity • dust • electromagnetic interference • level
Records	Records may include: • test reports • safety procedures • a history of equipment calibration and test results
Simple measuring instruments	Verifiers may be licensed to test and mark specific classes of instruments from the following list. Simple measuring instruments may include: • beverage measuring instruments • protein measuring instruments • length measuring instruments • area measuring instruments

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RANGE STATEMENT	
	• dimensional measuring instruments • vehicle tanks • milk tanks • any other instruments prescribed by the National Measurement Institute

Unit Sector(s)

Unit sector	Trade Measurement

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATMVER401A Verify a limited weighing instrument

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to apply National Test Procedures to determine whether a non-automatic weighing instrument (<3 tonne) or catchweigher is suitable for trade and then mark it accordingly. It also involves the installation and/or repair of weighing instruments.

Application of the Unit

Application of the unit	This unit of competency is applicable to verifiers who operate under a licence to test and mark specific classes of weighing instruments. They may also undertake sales, installation and/or repair of a limited class of weighing instruments. Weighing instruments are used in a very wide range of commerce. For example, electronic weighing instruments are used to measure a wide range of products at the point of sale, as an order or as a pre-packaged article. The range of environments where these instruments is almost limitless. Some examples of these environments includes pharmaceutical laboratories, supermarkets, fresh food retailers, packing houses, chemical/petroleum industry, contruction, mining and other extractive industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Install and repair weighing instruments	1.1. Access and correctly interpret information for installing or repairing instruments 1.2. Select required components, tools and equipment in accordance with manufacturer/component supplier specifications 1.3. Perform installation or repair in accordance with legislation, industry codes of practice and organisational guidelines 1.4. Avoid instrument damage during installation or repair

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ELEMENT	PERFORMANCE CRITERIA
2. Prepare for verification	2.1. Identify and evaluate the type of instrument to be verified 2.2. Access and correctly interpret documentation required for the verification 2.3. Identify and access test equipment, products and consumables required for the verification 2.4. Liaise with the trader to provide the items required on site 2.5. Ensure specified test equipment is fit for purpose in accordance with applicable legislation and organisational procedures 2.6. Store and transport test equipment in accordance with organisational procedures and industry best practice 2.7. Identify relevant local workplace health and safety issues and implement appropriate control strategies
3. Evaluate weighing instrument performance	3.1. Evaluate whether the operating environment will impact on the instrument performance 3.2. Modify the operating environment or implement alternative arrangements to ensure reliable test conditions as necessary 3.3. Identify the maximum permissible errors for the instrument from the legislative requirements 3.4. Use test equipment safely in accordance with applicable legislation and organisational procedures 3.5. Check instrument for compliance with the appropriate Certificates of Approval 3.6. Inspect the instrument in accordance with relevant National Test Procedure and appropriate National Measurement Institute policy 3.7. Evaluate results against prescribed performance criteria and determine if the instrument is suitable for trade use in accordance with legislative requirements
4. Report verification results	4.1. Display the verification result on the instrument in accordance with legislative requirements 4.2. Use test reports to present verification results in the required format 4.3. Complete verification documentation in accordance with legislative requirements and organisational procedures 4.4. Communicate results within the specified time and in

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ELEMENT	PERFORMANCE CRITERIA
	accordance with organisational guidelines
5. Model and encourage compliance with statutory requirements	5.1. Apply organisation's procedures and practices to meet licensing authority's requirements 5.2. Clarify any issues about licensing requirements with the licensing authority as they arise 5.3. Review work and seek feedback from others to confirm continuing compliance with licensing requirements 5.4. Identify implications of non-compliance with licensing requirements 5.5. Identify inadequacies in trader's procedures and practices which may contribute to non-compliance with licensing requirements and/or national measurement legislation 5.6. Explain inadequacies and possible remedial actions to trader
6. Maintain statutory records	6.1. Keep accurate and complete records in accordance with licensing requirements 6.2. Ensure authorisation, training and relevant licences are current in accordance with organisational and licensing requirements 6.3. Inform the licensing administering authority of changes to personal information as required by statute

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- diagnosing faults in weighing instruments
- installing and repairing weighing instruments with a basic design
- accessing, interpreting and applying a range of documents for the verification of weighing instruments including:
  - national measurement legislation
  - routine National Test Procedures
  - Certificates of Approval

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REQUIRED SKILLS AND KNOWLEDGE

- National Measurement Institute verification policy
- national and international design rules
- pattern approval documents
- accessing and interpreting Certificates of Verification for a limited range of reference standards
- performing verifications over durations of up to one day in routine environments
- using advanced communication and negotiation skills to:
  - explain the purpose of verification
  - inform traders of non-compliances and consequences of failing to rectify them
  - explain verification procedures and outcomes to traders and managers
- accessing, transporting, setting up, validating, using and maintaining a limited range of test equipment and reference standards
- identifying and evaluating environmental impacts on performance of a range of weighing instruments
- conducting tests and recording results with close attention to detail and accuracy
- performing calculations involving:
  - fractions, decimals, ratios, proportions and percentages
  - scientific notation, correct units and the correct number of significant figures
  - interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation
- analysing performance results over a number of operating conditions
- planning routine tasks
- developing/implementing an efficient verification strategy that has a limited impact on traders, the public, employees and suppliers
- demonstrating professionalism and maintaining the rights of the trader at all times
- solving routine/expected problems
- working safely which may include applying basic first aid, confined space entry and working with heavy machinery

Required knowledge

- design, major components and functions for weighing instruments
- licensing requirements for a verifier including:
  - quality management system
  - licence conditions
  - maintenance of statutory records
- general chemical and physical principles and concepts including weight, mass and gravity
- knowledge of the operating procedures across a range of environments including laboratories, retail, manufacturing, industrial, mining, construction, medical, chemical, petroleum, farming and abattoirs
- knowledge of metrological terms and terminology specific to weighing instruments

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REQUIRED SKILLS AND KNOWLEDGE

such as maximum permissible errors, traceability, uncertainty, maximum permissible difference, eccentricity, repeatability, error of measurement, error of indication and linearisation
• national measurement legislation applicable to weighing instruments
• detailed knowledge of National Test Procedures and operating procedures for equipment and reference standards used in job role including:
  • purpose of test
  • test conditions and possible environmental impacts on performance of the instrument
  • key preparation/measurement steps in test method
  • calculation steps to give results in appropriate units and precision
  • maximum permissible errors for weighing instruments under inspection
• procedures for completing verification documentation
• organisational policy and procedures for verifying weighing instruments
• safety principles and procedures relevant to instruments and test environment
• basic first aid and site safety induction if required

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard for one class of weighing instrument listed in the Range Statement.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify, access and apply test procedures • identify and use suitable reference standards • install and repair weighing instruments to meet statutory requirements • evaluate and adjust the impact of the operating environment on the performance of the instrument • analyse test results to determine the instrument's suitability for verification (trade use) • maintain the security and confidentiality of data in accordance with organisational and regulatory

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EVIDENCE GUIDE	
	requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • MSATMREF301A Use and maintain reference standards. Resources may include: • limited weighing instruments, test equipment and reference standards • computer and relevant software and/or organisation information management system • Certificates of Approval for instruments • relevant legislative and organisational procedures.
Method of assessment	The following assessment methods are suggested: • questions to assess understanding of relevant procedures and remedial actions • review of verification reports prepared by the candidate • feedback from supervisors and peers regarding the candidate's ability to verify the performance of weighing instruments in accordance with legislative and organisational procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. A retail butcher uses a digital weighing instrument to sell meat with a gross retail cost of $500,000 annually and where the price per kilogram ranges from 5.99/kg to $68/kg. As the profit margin of the butcher's business depends on the product received and sold, the butcher contracts a scale repair company to test his buying and

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EVIDENCE GUIDE	
	selling scales for accuracy.The scale repairer arrives at the butcher's premises with a trolley load of equipment. After their introductions, the butcher enquires as to what all the gear on the trolley is for. The repairer explains that it is all part of the equipment needed to satisfy the licensing requirements of national Trade Measurement. The repairer advises that for this job he needs masses which have a suitable capacity and accuracy for the scale, that have been tested and are still within their expiry period. Not only does he need 15kg for the capacity of the instrument but also smaller masses down to 0.2g to test the scale correctly according to the National Test Procedures that he has brought with him. To keep up to date with new scales, he also has a laptop with internet access to download the latest Certificate of Approval for the instrument from the National Measurement Institute website. Regardless of how accurate the scale is, it can't be used for trade (i.e. buying or selling) unless it is approved for trade use by the National Measurement Institute. He also has the paper work required by national Trade Measurement to issue depending on whether the instrument complies and can be certified or not. Finally, he explains that he has tools in case the scales need adjustment if they are outside the maximum permissible errors set down by the National Measurement Institute. The scale repairer inspects the scales for compliance with the Certificates of Approval and tests them. He finds the selling scale is approved for trade use but is incorrect and the buying scale, while weighing correctly, is not approved.The repairer fixes the selling scale, marks it with a certification mark and issues a certification form. The buyingscale cannot be certified because it is not an approved type and the repairer issues a notice of non-compliance advising the butcher that it can no longer be used for trade. Before leaving the butcher shop, the repairer completes his paper work and submits it to national Trade Measurement within the specified 14 days.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Prescribed performance criteria for instruments	Prescribed performance criteria for instruments may include: • design is in accordance with the appropriate Certificates of Approval • performance meets the criteria described in the Certificates of Approval, National Test Procedure and legislation
Appropriate documentation	Where reference is made to documentation, it is expected the latest version will be used. Appropriate documentation may include: • reference standards • Certificates of Verification • Certificates of Approval for limited weighing instruments • test procedures for verifying limited weighing instruments • organisational test reports • organisational procedures e.g. company quality assurance manual • National Measurement Act • occupational health and safety (OHS) regulations, guidelines and procedures material data safety sheets • equipment manuals and warranty, supplier catalogues and handbooks
Certificates of Approval	Certificates of Approval may include: • any Certificate issued by the Chief Metrologist under Regulation 60 of the National Measurement Regulations approving the pattern of a limited weighing instrument as being suitable for trade
Test equipment	Test equipment may include:

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RANGE STATEMENT	
	• reference standards of measurement
Legislation	Legislation may include: • national measurement legislation • applicable Commonwealth, state and territory OHS legislation
National Measurement Institute policy	National Measurement Institute policy may include: • accepted test procedure variations • bulletin • instruction • determination
National Test Procedures for weighing instruments	National Test Procedures for weighing instruments may include those for: • non-automatic weighing machines • automatic Class Y(a) Catchweighers • automatic Class Y(b) Catchweighers • any other test procedure prescribed by the National Measurement Institute
OHS and environmental management requirements	OHS and environmental management requirements refer to: • all operations must comply with enterprise occupational health safety and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health
Operating environmental impacts	Operating environmental impacts may include: • vibration • wind • humidity • heat

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RANGE STATEMENT	
	• dust • electromagnetic interference • out of level
Records	Records may include: • test reports • safety procedures • a history of equipment calibration and test results
Weighing instruments	Verifiers may be licensed to test and mark specific classes of instruments from the following list. Weighing instruments may include: • non-automatic weighing machines tested without substitution loads • automatic Class Y(a) Catchweighers • automatic Class Y(b) Catchweighers • any other instruments prescribed by the National Measurement Institute

Unit Sector(s)

Unit sector	Trade Measurement

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATMVER402A Verify a liquid measuring instrument using volume measures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to apply National Test Procedures to determine whether a liquid measuring instrument using volume measures is suitable for trade and then mark it accordingly. It also involves the installation and/or repair of liquid measuring instruments.

Application of the Unit

Application of the unit	This unit of competency is applicable to verifiers who operate under a licence to test and mark specific classes of liquid measuring instruments tested using a volume measure only. They may also undertake sales, installation and/or repair of liquid measuring instruments. Liquid measuring instruments are used in a very wide range of commerce. For example, petrol bowsers measure fuel at the point of sale and flowmeters are used to measure bulk commodities such as milk, chemicals and petroleum products during production and distribution. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Install and repair liquid measuring instruments	1.1. Access and correctly interpret information for installing or repairing instruments 1.2. Select required components, tools and equipment in accordance with manufacturer/component supplier specifications 1.3. Perform installation or repair in accordance with legislation, industry codes of practice and organisational guidelines 1.4. Avoid instrument damage during installation or repair
2. Prepare for verification	2.1. Identify and evaluate the type of instrument to be verified 2.2. Access and correctly interpret documentation required for the verification

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Identify and access test equipment, products and consumables required for the verification 2.4. Liaise with the trader to provide the items required on site 2.5. Ensure specified test equipment is fit for purpose in accordance with applicable legislation and organisational procedures 2.6. Store and transport test equipment in accordance with organisational procedures and industry best practice 2.7. Identify relevant local workplace health and safety issues and implement appropriate control strategies
3. Evaluate liquid measuring instrument performance	3.1. Evaluate whether the operating environment will impact on the instrument performance 3.2. Modify the operating environment or implement alternative arrangements to ensure reliable test conditions as necessary 3.3. Identify the maximum permissible errors for the instrument from the legislative requirements 3.4. Use test equipment safely in accordance with applicable legislation and organisational procedures 3.5. Check instrument for compliance with the appropriate Certificates of Approval 3.6. Inspect the instrument in accordance with relevant National Test Procedure and appropriate National Measurement Institute policy 3.7. Evaluate results against prescribed performance criteria and determine if the instrument is suitable for trade use in accordance with legislative requirements
4. Report verification results	4.1. Display the verification result on the instrument in accordance with legislative requirements 4.2. Use test reports to present verification results in the required format 4.3. Complete verification documentation in accordance with legislative requirements and organisational procedures 4.4. Communicate results within the specified time and in accordance with organisational guidelines
5. Model and encourage compliance with statutory	5.1. Apply organisation's procedures and practices to meet licensing authority's requirements 5.2. Clarify any issues about licensing requirements with

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ELEMENT	PERFORMANCE CRITERIA
requirements	the licensing authority as they arise 5.3. Review work and seek feedback from others to confirm continuing compliance with licensing requirements 5.4. Identify implications of non-compliance with licensing requirements 5.5. Identify inadequacies in trader's procedures and practices which may contribute to non-compliance with licensing requirements and/or national measurement legislation 5.6. Explain inadequacies and possible remedial actions to trader
6. Maintain statutory records	6.1. Keep accurate and complete records in accordance with licensing requirements 6.2. Ensure authorisation, training and relevant licences are current in accordance with organisational and licensing requirements 6.3. Inform the licensing administering authority of changes to personal information as required by statute

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- diagnosing faults in liquid measuring instruments
- installing and repairingliquid measuring instruments with a basic design
- accessing, interpreting and applying a range of documents for the verification of liquid measuring instruments including:
  - national measurement legislation
  - intermediate National Test Procedures
  - Certificates of Approval
  - National Measurement Institute inspection policy
  - Australian Standards
  - industry codes of practice
  - correction tables for volume, density and pressure for a range of liquids

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REQUIRED SKILLS AND KNOWLEDGE

- national and international design rules
- pattern approval documents
- performing verification tests over extended durations in non-routine and hazardous environments
- accessing and interpreting Certificates of Verification for a range of reference standards
- using advanced communication and negotiation skills to:
  - explain purpose of the verification
  - inform traders of non-compliances and consequences of failing to rectify
  - access external equipment and resources to complete the verification
  - explain verification procedures and outcomes to tradersand managers
- accessing, transporting, setting up, validating, using and maintaining a broad range of test equipment and reference standards
- identifying and evaluating environmental factors that may impact on performance of liquid measuring instruments
- organising large equipment to be dispatched ahead of verification visit
- conducting tests and recording results with close attention to detail and accuracy
- performing calculationsinvolving:
  - fractions, decimals, ratios, proportions and percentages
  - evaluation of formulae containing powers, exponents and logarithms functions
  - use of scientific notation, correct units and correct number of significant figures
  - calculation of uncertainties
  - preparation and interpretation of linear, semi-log and log-log graphs
  - interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation
  - determination of regression line equations and correlation coefficients
  - preparation and interpretation of more complex control charts and frequency distribution plots
- planning complex tasks
- developing/implementing an efficient verification strategy that minimises disruption to traders, the public, technicians, employees, colleagues and suppliers
- demonstrating professionalism and maintaining the rights of the trader at all times
- solving unexpected problems and non-routine issues
- working safely which may include applying basic first aid, confined space entry, working with hazardous materials, working safely in hazardous environments, working with heavy machinery, Australian Institute of Petroleum (AIP) cold work clearance permit, safety induction and working at heights

Required knowledge

- design, major components and functions of liquid measuring instruments
- licensing requirements for a verifier including:

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REQUIRED SKILLS AND KNOWLEDGE

- quality management system
- licence conditions
- maintenance of statutory records

- general chemical and physical principles and concepts including:
  - physical states (solid, liquid gas)
  - weight, mass, gravity and density
  - pressure, pressure differential, backpressure and head pressure
  - fluid flow
  - flashpoint, boiling point and ice point
  - viscosity
  - temperature effects and coefficients of expansion
- knowledge of the operating procedures across a range of environments including laboratories, retail, commercial, office, manufacturing, industrial, mining, construction, medical, chemical and petroleum
- knowledge of metrological terms and terminology specific to liquid measuring instruments such as:
  - maximum permissible errors, maximum permissible difference and maximum permissible variation
  - traceability
  - repeatability
  - uncertainty, error of measurement and error of indication
  - meter creep
  - hose dilation
  - temperature correction
  - linearisation
  - gas elimination
- national measurement legislation applicable to liquid measuring instruments
- detailed knowledge of National Test Procedures and operating procedures for equipment and reference standards used in job role including:
  - purpose of test
  - test conditions and possible environmental impacts on performance of the instrument
  - key preparation/measurement steps in test method
  - calculation steps to give results in appropriate units and precision
  - maximum permissible errors for liquid measuring instruments under inspection
- procedures for completing verification documentation
- organisational policy and procedures for verifying instruments
- safety principles and procedures relevant to instruments
- basic first aid and site safety induction if required

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard for one class of liquid measuring instrument listed in the Range Statement.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify, access and apply test procedures • identify and use suitable reference standards • install and repair liquid measuring instruments to meet statutory requirements • evaluate and adjust the impact of the operating environment on the performance of the instrument • analyse test results to determine the instrument's suitability for verification (trade use) • maintain the security and confidentiality of data in accordance with organisational and regulatory requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • MSATMREF301AUse and maintain reference standards. Resources may include: • liquid measuring instruments using volume measures, test equipment and reference standards • computer and relevant software and/or organisation information management system • Certificates of Approval for instruments • relevant legislative and organisational procedures.
Method of assessment	The following assessment methods are suggested:

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EVIDENCE GUIDE	
	• questions to assess understanding of relevant procedures and remedial actions • review of verification reports prepared by the candidate • feedback from supervisors and peers regarding the candidate's ability to verify the performance of instruments in accordance with legislative and organisational procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. A service station operator of a large company owned site requests a servicing company to visit their site as he has noticed that one fuel dispenser has a faulty display and the service station appears to have inconsistent dip reading. The verifier arrives and introduces himself and informs the owner that under their contract all fuel dispensers are due for checking. The verifier completes a safety check, AIP clearance form and asks about the location of the fuel return points. The verifier then blocks the lane next to the fuel dispenser, puts safety signs, barricades and test measures in place and ensures that the work area is safe.The verifier repairs the faulty display and proceeds to test the fuel dispenser. He visually checks the fuel dispenser against the Certificate of Approval and checks for any leaks noting any discrepancies on a verification report form. He then tests the fuel dispenser as per the National Test Procedures noting results on the test report and returning dispensed fuel to the storage tanks in a safe manner. The verifier finds the fuel dispenser is outside the maximum permissible error and adjusts the dispenser. After repeating the National Test Procedure, he finds the dispenser is within the maximum permissible error and then seals and marks the dispenser with his mark. The verifier then tests the other fuel dispensers on-site.

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EVIDENCE GUIDE	
	Some require adjustment before being verified and marked. Another dispenser is within the maximum permissible error and does not require adjustment. One dispenser cannot be adjusted within the maximum permissible error and the verifier removes the mark. After all dispensers are tested, the verifier completes the verification forms, fuel usage form and AIP form. The verifier informs the site manager that one dispenser cannot be used as it is non-compliant and issues a non-compliancy form. The site manager locks the dispenser until repairs can be made. The remaining forms are given to the site manager and the verifier departs.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Prescribed performance criteria for instruments	Prescribed performance criteria for instruments may include: • design is in accordance with the appropriate Certificates of Approval • performance meets the criteria described in the Certificates of Approval, National Test Procedure and legislation
Appropriate documentation	Where reference is made to documentation, it is expected the latest version will be used. Appropriate documentation may include: • reference standards • Certificates of Verification • Certificates of Approval for liquid measuring instruments • test procedures for verifying liquid measuring instruments • organisational test reports

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RANGE STATEMENT	
	• organisational procedures e.g. company quality assurance manual • National Measurement Act • occupational health and safety (OHS) regulations, guidelines and procedures and material safety data sheets (MSDS) • equipment manuals and warranty, supplier catalogues and handbooks
Certificates of Approval	Certificates of Approval may include: • any Certificate issued by the Chief Metrologist under Regulation 60 of the National Measurement Regulations approving the pattern of a liquid measuring instrument as being suitable for trade
Test equipment	Test equipment may include: • reference standards of measurement • equipment other than reference standards of measurement such as pumps, funnels and hoses
Legislation	Legislation may include: • national measurement legislation • applicable Commonwealth, state and territory OHS legislation
National Measurement Institute policy	National Measurement Institute policy may include: • accepted test procedure variations • bulletin • instruction • determination
National Test Procedures for liquid measuring instruments	National Test Procedures for liquid measuring instruments may include: • fuel dispensers other than LPG dispensers • bulk flowmetering systems for liquid hydrocarbons other than LPG tested using a volume measure • milk flowmeters tested using a volume measure • any other test procedure prescribed by the National Measurement Institute

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RANGE STATEMENT	
OHS and environmental management requirements	OHS and environmental management requirements refer to: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health
Operating environmental impacts	Operating environmental impacts may include: • vibration • wind • heat • dust • electromagnetic interference • out of level
Records	Records may include: • test reports • safety procedures • a history of equipment calibration and test results
Liquid measuring instruments may include:	Verifiers may be licensed to test and mark specific classes of instruments from the following list. Liquid measuring instruments may include: • fuel dispensers other than LPG dispensers • bulk flowmetering systems for liquid hydrocarbons other than LPG tested using a volume measure • milk flowmeters tested using a volume measure • any other liquid measuring instrument prescribed by the National Measurement Institute

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Unit Sector(s)

Unit sector	Trade Measurement

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATMVER403A Verify inspector's class reference standards

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to calibrate reference standards to the inspector's class level in accordance with standard calibration procedures. These procedures specify all associated reference standards, equipment and methods to be used and the required parameters, quantities and ranges to be tested, including the criteria for validation or rejection. Standard calibration procedures are sometimes complex and lengthy but must be carried out in a methodical and standard manner. Personnel are not permitted to deviate from explicit instructions in any manner, nor modify the procedure, nor substitute alternative equipment.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory and calibration technicians who carry out testing and/or calibrations using standard calibration methods in National Association of Testing Authorities (NATA) accredited laboratories. They work under limited supervision and their results are interpreted and checked by the laboratory supervisor, quality officer or designated signatory. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section This competency in practice'.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Receive and schedule inspector's class reference standards for calibration	1.1. Identify the level of verification required by the client 1.2. Evaluate and implement appropriate strategies where the standard's suitability for purpose does not meet client expectations 1.3. Enter details for the inspector's class reference standard into the organisation's information management system and apply appropriate tracking mechanisms 1.4. Process 'urgent' calibration requests according to the

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ELEMENT	PERFORMANCE CRITERIA
	organisation's policy and procedures 1.5. Maintain confidentiality of all client and organisation data and information 1.6. Ensure that information provided to clients is accurate, relevant and authorised for release 1.7. Deal with customers politely, efficiently and in accordance with organisational policy and procedures
2. Prepare for calibration	2.1. Identify and access the appropriate procedure for the calibration in accordance with organisational policy and procedures 2.2. Identify possible sources of measurement error during calibration and implement appropriate control strategies 2.3. Condition inspector's class reference standards and high order reference standards in accordance with calibration and organisational procedures where applicable 2.4. Identify hazards and use the specified personal protective equipment, safety equipment and procedures 2.5. Evaluate the suitability of high order reference standards and measuring equipment selected for the calibration against the organisation's specification requirements and calibration procedure 2.6. Document calibration status, report out-of-calibration test equipment/high order reference standards and quarantine where required
3. Perform calibration	3.1. Assess the design and appearance of an inspector's class reference standard against prescribed stadards 3.2. Perform calibration without variance according to the documented procedure to ensure repeatability of measurement 3.3. Confirm readings are the result of a valid measurement and record data as required 3.4. Adjust inspector's class reference standard if applicable
4. Analyse and report calibration results	4.1. Estimate and document uncertainty of measurement in accordance with organisation's policy and procedures, if required 4.2. Identify prescribed performance criteria for the inspector's class reference standard and evaluate against calibration results

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ELEMENT	PERFORMANCE CRITERIA
	4.3. Analyse calibration results to confirm they are within the maximum permissible variation and uncertainty for the scope of calibration 4.4. Analyse any variances from the performance criteria to identify isolated or systemic problems with the inspector's class reference standards or calibration procedure 4.5. Record the results of each test/calibration accurately, unambiguously and objectively
5. Finalise calibration	5.1. Attach calibration labels, equipment stickers, quality control tags and tamper resistant seals as required by the organisation's procedures 5.2. Prepare and submit to the laboratory supervisor a final report on the calibration detailing procedure, traceability, results and all other required information 5.3. Store test equipment/high order reference standards and calibration records in accordance with organisational policy and procedures 5.4. Identify and report unserviceable equipment or high order reference standards to the laboratory supervisor 5.5. Clean equipment and high order reference standards in accordance with organisational policy and procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- accessing, interpreting and applying a range of documents for the verification of reference standards including:
  - national measurement legislation
  - National Measurement Institute laboratory operating procedures
  - National Measurement Institute monographs
- accessing and interpreting Certificates of Verification for a range of higher order reference standards
- maintaining very close attention to procedures, accuracy and precision of measurement to ensure integrity of test/calibration results (especially during

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REQUIRED SKILLS AND KNOWLEDGE

lengthy tests)
• examining each calibration step critically to ensure repeatability and validity of data
• selecting, setting up, validating, using and maintaining a range of balances and reference standards
• operatingtest equipment correctly and safely
• applying all relevant procedures and regulatory requirements to ensure the quality and integrity of the services or data provided
• conducting tests and recording results with close attention to detail and accuracy
• performing calculations involving:
  • fractions, decimals, ratios, proportions and percentages
  • scientific notation, correct units and the correct number of significant figures
  • interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation
• recognising problems or departures in systems and documentation and initiating actions to prevent or minimise them
• preparing test/calibration documentation that is accurate and complies with requirements
• recognising and reporting opportunities for improvements to procedures
• planning routine tasks
• solving routine/expected problems
• working safely which may include applying basic first aid

Required knowledge
• understanding of the purpose of metrology and calibration, including common terminology, concepts, principles, procedures and applications • detailed knowledge of specific metrology terms and principles such as uncertainty, maximum permissible variations, traceability and legal requirements for traceability • NATA's and the National Measurement Institute's role in the measurement and testing system in Australia, measurement standards laboratories • requirements for the competence of testing and calibration laboratories (for example, AS ISO/IEC 17025) as they affect job role and responsibilities • national measurement legislation applicable to verification of inspector's class reference standards • selection and application of appropriate test methods and calibration procedures • hierarchy and appropriate selection of reference instruments • detailed knowledge of calibration procedures (equipment, measurement steps, test conditions, environmental impacts, calculations, uncertainty treatment) to give results in appropriate accuracy, precision and units • use of calibration and correction charts • methods for statistical analysis (means, ranges, standard deviations) and estimation

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REQUIRED SKILLS AND KNOWLEDGE
of uncertainty of measurement (may include the use of software) • non-conformance/non-compliance procedures and protocols associated with equipment, reference material and calibration procedures • troubleshooting procedures for equipment and test methods • handling, transport, storage and operation of reference and working standards • laboratory environmental control requirements • organisation's policy and procedures for verifying inspector's class reference standards • lines of communication, reporting procedures and legislative requirements • relevant health, safety and environmental requirements safety principles and procedures relevant test environment, basic first aid and site safety induction if required

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard for any inspector's class reference standards listed in the Range Statement.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify, access and apply calibration procedures • identify and use high order reference standards of measurement • evaluate and adjust the impact of the operating environment on the results of the calibration • identify the scope of a calibration and compare results with expected outcomes • maintain the security and confidentiality of data in accordance with organisational and regulatory requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment.

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EVIDENCE GUIDE	
	This unit of competency may be assessed with: • MSATMREF301A Use and maintain reference standards. Resources may include: • reference standards, balances, weighing instruments and test equipment • computer and relevant software and/or organisation information management system • National Measurement Institute laboratory operating procedures • relevant legislative and organisational procedures.
Method of assessment	The following assessment methods are suggested: • questions to assess understanding of relevant metrology/calibration terms, principles and procedures • review of calibration reports prepared by the candidate • feedback from supervisors and peers regarding the candidate's ability to verify inspector's class reference standards in accordance with legislative and organisational procedures • observation of the candidate calibrating inspector's class reference standards. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. A customer delivers a 200 L Inspectors Class 1 Volume measure for calibration. Personnel in the laboratory's item reception area log the job and the laboratory supervisor assigns it to a calibration technician. He/she reads the work order and retrieves the approved calibration procedure. The procedure requires the measure to be tested gravimetrically. The technician accesses and validates the test equipment and high order

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EVIDENCE GUIDE	
	reference standards. The density of the town water supply is determined using a verified hydrometer. The measure is visually inspected for defects and contamination. The volume of the measure is determined three times by filling the measure with town water to the capacity mark, recording the temperature of the water and recording the mass of water. This data is used, in conjunction with the town water density (determined previously) and thermal appropriate expansion/buoyancy corrections, to calculate the actual volume of the measure. The technician notes that some values are outside the allowable tolerance and adjustments will have to be made. He/she takes another set of readings after making the necessary adjustments and records them on the report. The technician applies the required calibration marks to the measure, updates the database, produces a test report and places the item in the despatch area for inspection by the supervisor. The supervisor visually inspects the item and checks the calibration data on the report. The job has taken four hours to complete.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Appropriate documentation	Where reference is made to documentation, it is expected the latest version will be used. Appropriate documentation may include: • high order reference standard Certificates of Verification • test methods, calibration procedures and monographs (validated and authorised) • organisational test reports • organisational procedures e.g. company quality assurance manual

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RANGE STATEMENT	
	• National Measurement Institute laboratory operating procedures • National Measurement Act • occupational health and safety (OHS) regulations, guidelines and procedures • equipment manuals and warranty, supplier catalogues and handbooks • quality manuals, equipment and operating/technical manuals • enterprise recording and reporting procedures and standard operating procedures (SOPs)
Hazards	Hazards may include: • electric shock • disturbance or interruption of services • manual handling of heavy equipment boxes
Safety procedures	Safety procedures may include: • use of personal protective equipment, such as hearing protection, gloves, safety glasses and coveralls • ensuring access to service shut-off points • regular cleaning of equipment and work areas
Inspectors Class Reference standards	Inspectors Class Reference standards may include: • inspector's class of reference standards as defined in the National Measurement Regulations
Operating procedures	Operating procedures may include: • manufacturers' specifications • industry guidelines • Australian standards • procedures and guidelines based on national measurement legislation
Legislation	Legislation may include: • national measurement legislation • applicable Commonwealth, state and territory OHS legislation
OHS and environmental management requirements	OHS and environmental management requirements refer to: • all operations must comply with enterprise

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RANGE STATEMENT	
	OHS and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health
Operating environmental impacts	Operating environmental impacts may include: • vibration • wind • heat • dust • electromagnetic interference • out of level • liquid being measured
Records	Records may include: • test reports • safety procedures • a history of equipment calibration and test results
Standard calibrations	Standard calibrations may involve testing and/or calibrating the following equipment and reference materials using standard methods and procedures: • common types of test equipment such as balances, calipers, masses, micrometers, tape measures, rules, temperature (digital) indicating systems, thermometers, timing devices, weighing instruments and volume measures

Unit Sector(s)

Unit sector	Trade Measurement

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSATMVER501A Verify a complex measuring instrument

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to apply National Test Procedures to determine whether a complex measuring instrument is suitable for trade use. It involves the ability to install/repair instruments, perform lengthy calculations to assess instrument performance and conduct tests that may require coordination of a range of resources over long durations in hazardous environments.

Application of the Unit

Application of the unit	This unit of competency is applicable to verifiers who operate under a licence to test and mark a specific class of complex measuring instruments. Complex measuring instruments are used in a wide range of heavy industries. For example, automatic rail weighbridges, belt weighers, totalising hoppers and liquid petroleum gas (LPG) flow meters are used throughout the mining, road/rail freight and petroleum/gas industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Install and repair a complex measuring instrument	1.1. Plan installation/repair strategy to ensure minimal disruption to the public and/or trader 1.2. Access and correctly interpret information for installing or repairing instrument 1.3. Select required components, tools and equipment in accordance with manufacturer/component supplier specifications 1.4. Perform installation or repair in accordance with legislation, industry codes of practice and organisational guidelines 1.5. Avoid instrument damage during installation or repair 1.6. Perform a pre-verification test to validate instrument performance

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ELEMENT	PERFORMANCE CRITERIA
2. Prepare for verification	2.1. Identify and evaluate the type of instrument to be verified 2.2. Access and correctly interpret documentation required for the verification 2.3. Identify and access test equipment, products and consumables required for the verification 2.4. Ensure specified test equipment is fit for purpose in accordance with applicable legislation and organisational procedures 2.5. Store and transport test equipment in accordance with organisational procedures and industry best practice 2.6. Develop a verification strategy to maximise resources and minimise time required for complex tests
3. Liaise with the trader to schedule complex tests	3.1. Discuss testing arrangements with site controller where applicable 3.2. Identify relevant local workplace, health and safety issues and implement appropriate control strategies 3.3. Discuss the verification strategy with the trader to minimise its impact on the trader's normal operations 3.4. Arrange site clearances and suitable scheduling for tests 3.5. Negotiate access to trader's equipment, materials and support personnel required for testing to be available on site 3.6. Arrange for any equipment to be provided by the trader, if required, by the National Test Procedure
4. Initiate verification	4.1. Identify the site contoller and explain/review the purpose of the verification 4.2. Review verification strategy to ensure there is minimal disruption to the public and/or trader 4.3. Communicate verification strategy to personnel supporting the verification 4.4. Identify locations for product return or disposal, if applicable 4.5. Evaluate the impacts of the operating environment on the instrument performance or test results and implement corrective actions as necessary 4.6. Identify operational factors impacting on instrument performance or test result and implement corrective

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ELEMENT	PERFORMANCE CRITERIA
	actions as necessary
5. Evaluate complex measuring instrument performance	5.1. Identify the maximum permissible errors for the instrument from the legislative requirements 5.2. Manage and review resources to maintain verification timelines 5.3. Provide effective communication to ensure relevant personnel are informed of variations to the verification strategy and verification progress 5.4. Check instrument for compliance with the appropriate Certificates of Approval 5.5. Test the instrument in accordance with relevant National Test Procedure and appropriate National Measurement Institute Policy
6. Analyse verification results	6.1. Perform specified calculations to determine a performance result for the instrument with appropriate accuracy, precision and significant figures 6.2. Use graphical and statistical analysis to determine unknowns as necessary 6.3. Ensure calculations are consistent with estimations and reasonable expectations 6.4. Evaluate results against prescribed performance criteria and determine if the instrument is suitable for trade use in accordance with legislative requirements
7. Model and encourage compliance with statutory requirements	7.1. Apply organisation's procedures and practices to meet licensing requirements 7.2. Clarify any uncertainty about licensing requirements with licensing authority as they arise 7.3. Review work and seek feedback from others to confirm continuing compliance with licensing requirements 7.4. Identify implications of non-compliance with licensing requirements 7.5. Raise inadequacies in organisation's procedures and practices which may contribute to non-compliance with licensing requirements 7.6. Identify and communicate inadequacies with trader's procedures and practices which may contribute to non-compliance with national measurement legislation
8. Report verification	8.1. Display the verification result on the instrument in

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ELEMENT	PERFORMANCE CRITERIA
results	accordance with legislative requirements 8.2. Use test reports to present verification results in the required format 8.3. Complete verification documentation in accordance with legislative requirements and organisational procedures 8.4. Communicate results within the specified time and in accordance with organisational guidelines
9. Maintain statutory records	9.1. Keep accurate and complete records in accordance with licensing requirements 9.2. Ensure authorisation, training and relevant licences are current in accordance with organisational and licensing requirements 9.3. Inform the licensing administering authority of changes to personal information as required by statute

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- diagnosing faults in complex measuring instruments
- installing and repairing measuring instruments with a complex design
- installing/upgrading software
- accessing, interpreting and applying a range of documents for the verification of complex measuring instruments including:
  - national measurement legislation
  - intermediate National Test Procedures
  - Certificates of Approval
  - National Measurement Institute inspection policy
  - Australian Standards
  - industry codes of practice
  - correction tables for volume, density and pressure for a range of liquids
  - national and international design rules
  - pattern approval documents
- performing verification tests over extended durations up to five days in non-routine

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REQUIRED SKILLS AND KNOWLEDGE

and hazardous environments
• accessing and interpreting Certificates of Verification for a wide range of reference standards
• using advanced communication and negotiation skills to:
  • explain purpose of the verification
  • inform traders of non-compliances and consequences of failing to rectify
  • access external equipment and resources to complete the verification
  • explain verification procedures and outcomes to traders and managers
• accessing, transporting, setting up, validating, using and maintaining a broad range of test equipment and reference standards
• organising large equipment to be dispatched ahead of verification visit
• identifying and evaluating environmental factors that may impact on performance of complex measuring instruments
• conducting lengthy tests and recording results with close attention to detail and accuracy
• performing calculations involving:
  • fractions, decimals, ratios, proportions and percentages
  • evaluation of formulae containing powers, exponents and logarithms functions
  • use of scientific notation, correct units and correct number of significant figures
  • calculation of uncertainties
  • preparation and interpretation of linear, semi-log and log-log graphs
  • interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation
  • determination of regression line equations and correlation coefficients
  • preparation and interpretation of more complex control charts and frequency distribution plots
• analysing performance results over a broad range of operating conditions
• planning complex tasks
• developing/implementing an efficient verification strategy that minimises disruption to traders, the public, technicians, employees, colleagues and suppliers
• demonstrating professionalism and maintaining the rights of the trader at all times
• solving unexpected problems and non-routine issues
• working safely which may include applying basic first aid, confined space entry, working with hazardous materials, working safely in hazardous environments, working with heavy machinery, Australian Institute of Petroleum (AIP) cold work clearance permit, safety induction, working at heights and biosecurity issues

Required knowledge
• the design, major components and functions of relevant complex measuring instruments • licensing requirements for a verifier including:

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REQUIRED SKILLS AND KNOWLEDGE

- quality management system
- licence conditions
- maintenance of statutory records
- general chemical and physical principles and concepts including:
  - physical states (solid, liquid gas)
  - weight, mass, gravity and density
  - pressure, pressure differential, backpressure and head pressure
  - fluid flow
  - flashpoint, boiling point and ice point
  - viscosity
  - temperature effects and coefficients of expansion
- knowledge of the operating procedures across a range of environments including laboratories, retail, commercial, office, manufacturing, industrial, mining, construction, medical, chemical and petroleum
- knowledge of metrological terms and terminology specific to complex measuring instruments such as:
  - maximum permissible errors, maximum permissible difference and maximum permissible variation
  - traceability
  - repeatability
  - uncertainty, error of measurement and error of indication
  - meter creep
  - hose dilation
  - temperature correction
  - linearisation
  - gas elimination
- national measurement legislation applicable to complex measuring instruments
- detailed knowledge of National Test Procedures and operating procedures for equipment and reference standards used in job role including:
  - purpose of test
  - test conditions and possible environmental impacts on performance of the instrument
  - key preparation/measurement steps in test method
  - calculation steps to give results in appropriate units and precision
  - maximum permissible errors for complex measuring instruments under inspection
- procedures for completing verification documentation
- organisational policy and procedures for verifying instruments
- safety principles and procedures relevant to instruments and test environment

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REQUIRED SKILLS AND KNOWLEDGE
• basic first aid and site safety induction if required

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard for one class of complex instrument listed in the Range Statement.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify, access and apply test procedures • identify and use suitable reference standards • install and repair measuring instruments to meet statutory requirements • evaluate and adjust the impact of the operating environment on the performance of the instrument • analyse test results to determine the instrument's suitability for verification (trade use) • maintain the security and confidentiality of data in accordance with organisational and regulatory requirements • report results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • MSATMREF301A Use and maintain reference standards. Resources may include: • access to a complexmeasuring instrument, test equipment and reference standards • computer and relevant software and/or organisation information management system • Certificates of Approval for the instrument

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EVIDENCE GUIDE	
	• relevant legislative and organisational procedures.
Method of assessment	The following assessment methods are suggested: • questions to assess understanding of relevant complex test procedures and remedial actions • review of verification reports prepared by the candidate • feedback from supervisors and peers regarding the candidate's ability to verify the performance of instruments in accordance with legislative and organisational procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. A licensed verifier has been engaged by a large coal mine to verify a new belt weigher installation for trade use. In preparation, the verifier visits the site and considers how to complete the verification. He/she visually inspects the belt weigher and is satisfied that it complies with the Certificate of Approval. However, he/she determines that the 30 tonne hopper weigher which has been installed as a control instrument for the sole purpose of testing the belt weigher cannot be tested with 1 tonne masses due to access restrictions. The verifier discusses these issues with the local trade measurement inspector who offers two solutions. The inspector suggests testing the restricted access hopper weigher with 20 kg masses using the substitution method to reduce the number of test masses required or negotiating with the coal washing facility next door to use their 60 tonne weighbridge as the control instrument. The verifier considers the options and decides in the interests of workplace health and safety that the best option is to use the weighbridge next door. After considerable negotiation with the weighbridge owner, arrangements are made to test the weighbridge and make it available for the belt weigher test on Monday and

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EVIDENCE GUIDE	
	Tuesday of the following week. The trader organises to have 5000 tonnes of coal, a front end loader and three transfer vehicles available for the test. The verifier arranges with another organisation to have 20 tonnes of certified test masses delivered to the coal wash facility on Monday so he/she can test the weighbridge. On Monday, the verifier tests the weighbridge in accordance with the national uniform test procedures and confirms that it is suitable for use as the control instrument. Testing of the belt weigher commences in accordance with the national uniform test procedure and progresses well on the Monday. On Tuesday, the verifier arrives on site to find the tail drum on the conveyor belt has seized making it impossible to continue testing. As these repairs will take two days to repair, the test is terminated and rescheduled with all parties to be in two weeks. Two weeks later the weighbridge is again retested and found to be suitable as a control instrument. The belt weigher is tested fully in accordance with the National Test Procedures and found to be correct. The verifier marks the belt weigher with a verification mark, completes all the paper work including test reports and submits them to national Trade Measurement with 14 days.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Prescribed performance criteria for instruments	Prescribed performance criteria for instruments may include: • design is in accordance with the appropriate Certificates of Approval • performance meets the criteria described in the Certificates of Approval, National Test Procedure and legislation

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RANGE STATEMENT	
Appropriate documentation	Where reference is made to documentation, it is expected the latest version will be used. Appropriate documentation may include: • reference standards • Certificates of Verification • Certificates of Approval for complex instruments • test procedures for verifying complex instruments • organisational test reports • organisational procedures e.g. company quality assurance manual • National Measurement Act • occupational health and safety (OHS) regulations, guidelines and procedures and material safety data sheets (MSDS) • equipment manuals and warranty, supplier catalogues and handbooks
Certificates of Approval	Certificates of Approval may include: • any Certificate issued by the Chief Metrologist under Regulation 60 of the National Measurement Regulations approving the pattern of a complex instrument as being suitable for trade
Test equipment	Test equipment may include: • reference standards of measurement • equipment other than reference standards of measurement such as weighing instruments, pumping units, control instruments, two way communication, hoses, fittings, rail wagons, trains and tankers • LPG cylinders
Legislation	Legislation may include: • national measurement legislation • applicable Commonwealth, state and territory OHS legislation
National Measurement Institute policy	National Measurement Institute policy may include: • accepted test procedure variations

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RANGE STATEMENT	
	• bulletin • instruction • determination
National Test Procedures for complex instruments	National Test Procedures for complex instruments may include • non-automatic weighing machines >3 tonne • LPG dispensers • LPG bulk flowmetering systems • flowmetering systems tested using master meter or gravimetric methods • automatic rail weighbridges • continuous totalising automatic weighing instruments (belt weighers) • totalising hoppers weighing instruments • any other test procedure prescribed by the National Measurement Institute
OHS and environmental management requirements	OHS and environmental management requirements refer to: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or Federal legislation. These requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council and State and Territory Departments of Health
Operating environmental impacts	Operating environmental impacts may include: • vibration • wind • heat • dust • electromagnetic interference
Specified calculations	Specified calculations may include: • calculations involving fractions, decimals,

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RANGE STATEMENT	
	ratios, proportions and percentages • evaluation of formulae containing powers, exponents and logarithms functions • use of scientific notation, correct units and correct number of significant figures • calculation of uncertainties • preparation and interpretation of linear, semi-log and log-log graphs • calculation and interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation • determination of regression line equations and correlation coefficients • preparation and interpretation of more complex control charts and frequency distribution plots
Records	Records may include: • test reports • safety procedures • a history of equipment calibration and test results
Complex instruments	Verifiers may be licensed to test and mark specific classes of instruments from the following list. Complex instruments may include: • non-automatic weighing machines >3 tonne • LPG dispensers • LPG bulk flowmetering systems • flowmetering systems tested using master meter or gravimetric methods • automatic rail weighbridges • continuous totalising automatic weighing instruments (belt weighers) • totalising hoppers weighing instruments • any other complex measuring instrument prescribed by the National Measurement Institute

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Unit Sector(s)

Unit sector	Trade Measurement

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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AUM4003A Interpret customer requirements

Modification History

Not Applicable

Unit Descriptor

Not Applicable

Application of the Unit

Not Applicable

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Not Applicable

Employability Skills Information

Not Applicable

Elements and Performance Criteria Pre-Content

Not Applicable

Elements and Performance Criteria

Not Applicable

Required Skills and Knowledge

Not Applicable

Evidence Guide

Not Applicable

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Range Statement

Not Applicable

Unit Sector(s)

Not Applicable

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AURAAA4002 Determine retail rates for work

Modification History

Release	Comment
Release 1	Replaces AURA454516A Determine retail rates for work Unit code updated to meet policy requirements. Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence to calculate fixed and variable costs to determine retail rates for jobs performed. It also involves calculating the effects of discount on overall profitability. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit is applicable to the administration and repair sectors of the automotive industry. It includes: • work undertaken in-house • work involving subcontracting • costing of purchased parts for sale.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine fixed costs	1.1. Identify components of fixed costs 1.2. Use historical records and business knowledge to estimate fixed costs for next period 1.3. Calculate administrative and business operation overhead costs 1.4. Allocate proportion of fixed cost to be included in labour rate
2. Determine labour rate	2.1. Identify cost components of labour rate 2.2. Using historical records identify average chargeable hours of each category of staff 2.3. Calculate subcontractor cost component of jobs 2.4. Calculate applicable hourly retail rate for labour, including provision for fixed costs
3. Determine variable cost	3.1. Identify components of variable cost for job 3.2. Estimate and record materials required for the job 3.3. Use accounting records and details of job undertaken to calculate variable cost
4. Determine retail price of goods for resale	4.1. Research local market price for items 4.2. Estimate turnover volume of items 4.3. Calculate margins and mark-ups for each category of goods 4.4. Calculate effect of various discounts, loss leaders and specials on items based on retail price, volume and overall

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ELEMENT	PERFORMANCE CRITERIA
	business flow-on 4.5. Calculate effect of high pricing strategy on some items 4.6. Monitor effects of price changes on business levels and profitability

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• collect, organise and understand information related to determining retail rates • communicate ideas and information to establish appropriate retail rates for work • plan and organise activities to comply with requirements for determining business retail rates • work with others and in a team to allocate charges • use mathematical ideas and techniques to support the business operation • solve problems to establish business • use workplace technology to optimise performance
Required knowledge
• basic mathematical concepts, addition, subtraction, percentages and fractions

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	• Calculate cost for a range of retail service and repair jobs, including fixed, variable and component pricing. • Determine effect of price changes on overall business profitability. • Gathering cost estimates from external service

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EVIDENCE GUIDE	
	providers and documenting quotations.
Context of and specific resources for assessment	• Accounts payable and cash disbursement records, payroll records, equipment cost and asset register, pricing impact charts, stock turnover records, calculator or computer.
Method of assessment	Practical assessments: • determine hourly charge-out rate for classes of labour using proportion of fixed, variable and labour cost • determine on-cost for parts and components • determine effect of change in price on business profitability.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Calculations	Calculation will include: • overheads may be calculated for a specific job or be a constant component based on historical records and projections • overheads will include accommodation costs, utilities, depreciation, insurance, licence and other business charges • labour costs will include on-costs, such as leave provision, superannuation, training and workers' compensation • chargeable hours/productive hours based on total hours worked less acknowledged non-chargeable hours
Work requirements	Work requirements may include: • written and verbal communication • sourcing and costing parts and consumables • estimating costs • documentation

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RANGE STATEMENT	
	• specific requirements
External service providers	External service providers may be: • other departments • specialist businesses
Resources	Resources may include: • enterprise stationery, telephone and appropriate forms/business documents • repair order and job cards • component price lists • accounting records • purchasing records • computer, calculator and software • standard repair times
Information/documents	Sources of information/documents may include: • manufacturer/component supplier specifications • enterprise operating procedures • customer requirements • state/territory/industry Workplace Health and Safety (WHS) legislation • industry/workplace codes of practice

Unit Sector(s)

Unit sector	Administration

Co-requisite units

Not applicable.

Competency field

Competency field	Common

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AURACA2001 Establish relations with customers

Modification History

Release	Comment
Release 1	Replaces AURC270421A Establish relations with customers Unit code updated to meet policy requirements. Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the skills and knowledge required to establish effective relations with customers. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit of competency applies to the following and should be contextualised to the qualification to which it is being applied: • retail, service and repair

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Establish contact with customer	1.1. A welcoming customer environment is maintained 1.2. Customer is greeted warmly according to enterprise policies and procedures 1.3. An effective service environment is created through verbal and non-verbal presentation according to enterprise policies and procedures
2. Clarify specific needs of a customer	2.1. Customer needs are determined through questioning and active listening 2.2. Customer needs are accurately assessed against the products/services of the enterprise 2.3. Customer details are documented clearly and accurately in required format
3. Provide information and advice	3.1. Features and benefits of products/services provided by the enterprise are described/recommended to meet customer needs 3.2. Information to satisfy customer needs is provided 3.3. Alternative sources of information/advice are discussed with the customer 3.4. Alternatives are followed up
4. Follow up customer needs	4.1. Further information is dispatched to customer 4.2. Gaps in available information are identified and referred to relevant persons for action

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- collect, organise and understand information related to specific needs of customers being identified
- operational skills and techniques in questioning/listening, resolving conflict, following set routines and procedures, handling difficult or abusive customers and greeting/farewelling techniques
- literacy skills in regard to message-taking in person or by telephone and completing written or computer documents of customer details
- plan and organise activities for implementation of a customer service plan
- work with others and in a team by team members with specific skills being sought to meet customer needs
- use mathematical ideas and techniques for customer timeframes being identified and followed
- establish diagnostic processes in which a logical approach to issues is followed
- use workplace technology related to technical skills in operating enterprise telephone systems and other communication equipment

Required knowledge

General knowledge of

- enterprise policies and procedures in regard to:
  - customer service
  - dealing with difficult customers
  - allocated duties/responsibilities
- the range of enterprise merchandise and services, location of telephone extensions and departments/sections
- legislation and statutory requirements, including consumer law, trade practices and fair trading legislation
- industry/workplace codes of practice in relation to customer service

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

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EVIDENCE GUIDE	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • consistently applying enterprise policies and procedures and industry codes of practice in regard to customer service • providing a quality service environment by treating customers in a courteous and professional manner through all stages of the procedure • using effective questioning/active listening and observation skills to identify customer needs • communicating effectively with others involved in or affected by the work.

Context of and specific resources for assessment	• This unit may be assessed in conjunction with other units that form part of the job role or function.
	• Elements of competence contain both knowledge and practical components. Knowledge components may be assessed off the job. Practical components should be assessed on the job or in a simulated work environment.
	• Evidence is best gathered using the products, processes and procedures of the individual workplace as the means by which the candidate achieves industry competencies.
	• The following should be made available:
	  • a workplace or simulated workplace
	  • documentation, such as enterprise policy and procedure manuals relating to customer service, enterprise telephone directory, legislation and codes of practice
	  • a range of customers with different requirements (real or simulated)
	  • a communication system or a range of communication equipment
	  • enterprise products/services, features and benefits
	  • a qualified workplace assessor.

Method of assessment	It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons, subject to agreed authentication arrangements.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Business types	Enterprise may vary in size, type and location, and in the range of merchandise and services provided and in delivery policies
Customers	Customers may be regular or new and may have routine or special requests. They may include persons from a range of social, cultural or ethnic backgrounds and have physical and intellectual abilities. Regardless, all customers are made feel welcome, valued and, at the end of the process, satisfied. Customer contact may be face-to-face, by telephone or electronic means or in writing
Customer service	Customer service may include: • all enterprise activities, internal and external customers and follow-up in event of delays in service provision
Customer needs	Customer needs may require information regarding: • products or services available, quality of products or services, complementary products or services, enterprise facilities and services, and the location of specific items
Staff	Staff may be full-time, part-time or casual and vary in terms of training, product knowledge and in staffing levels. Staff may be operating in routine or busy trading conditions
Information/documents	Information/documents may include: • enterprise policies and procedures relating to customer service, equipment and product manufacturer/component supplier specifications, enterprise operating procedures, industry/workplace codes of practice and customer requirements

Unit Sector(s)

Unit sector	Sales and Marketing

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Co-requisite units

Not applicable.

Competency field

Competency field	Common

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AURACA3002 Establish customer requirements of a complex nature

Modification History

Release	Comment
Release 1	Replaces AURC362721A Establish customer requirements of a complex nature Unit code updated to meet policy requirements. Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence to establish customer requirements for sales, parts, administration, finance or services which are more complex. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Confirm customer requirements	1.1. Questioning and active listening techniques are used to clarify customer needs 1.2. Customer requirements are elicited professionally, courteously, with tact and without presumptions 1.3. Customer requirements are fed back accurately and concisely to the customer for confirmation 1.4. Customer requirements are documented accurately in language that can be understood by the customer and by staff 1.5. Customer requirements are documented in accordance with industry, legal and/or enterprise standards and procedures 1.6. Customer acknowledgement and confirmation of the documented requirements are obtained
2. Advise customer of available options	2.1. Viable options to customer needs are generated by the employee 2.2. Viable options that conform to industry, legal and/or enterprise policies and procedures are generated by the employee 2.3. Suppliers are contacted to research options 2.4. Options are explained and discussed with the customer to facilitate customer understanding 2.5. Supporting information is made available to the customer, to facilitate customer understanding 2.6. Benefits and approximate costs of each option are explained

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ELEMENT	PERFORMANCE CRITERIA
	to the customer to facilitate informed decision making
3. Inform customer of costs	3.1. Customer is provided with estimated costs and timeframes of selected option 3.2. Costs and timeframes are communicated verbally or in writing, in accordance with enterprise standards and procedures 3.3. Sale or service conditions are explained to customer
4. Agree action plan with customer	4.1. Customer's preferred option, including agreed delivery timeframe, is detailed in action plan 4.2. Agreed action plan is documented 4.3. Customer commitment to agreed action plan is gained, in accordance with enterprise requirements 4.4. Assistance with paperwork requiring completion by customer is provided 4.5. Customer feedback is sought on services provided

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- collect, organise and understand information related to collating and analysing customer requirements and information
- communication skills in relation to dealing with customers, difficult customers and managing conflict and negotiation
- literacy skills in regard to message taking in person or by telephone and completing written or computer documents of customer requirements and action plans
- plan and organise activities to select and follow processes/procedures to ensure desired outcome
- work with others and in a team by requesting and using information/assistance from colleagues
- use mathematical ideas and techniques to include numerical skills in relation to calculating/modelling various financial and/or insurance arrangements
- establish diagnostic processes which include operational skills and techniques in customer service and problem-solving skills
- use workplace technology related to technical skills in operating enterprise telephone systems and other communication equipment

Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE

Knowledge of:
• industry/enterprise policies and procedures in regard to:
  • customer service
  • customer requirements/needs documentation
  • allocated duties/responsibilities
• the range of enterprise merchandise and services, location of departments/sections and telephone extensions of departments/sections, suppliers, finance and insurance
• legislation and statutory requirements, including workplace health and safety (WHS), consumer law, trade practices and fair trading legislation
• industry/workplace codes of practice in relation to customer service

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • identifying customer requirements professionally, courteously, with tact and without presumptions • generating and advising customer of viable options to meet customer needs • calculating and informing customer of detailed costs and timeframes of agreed option • proposing and gaining agreement by customer to an action plan to satisfy customer needs.
Context of and specific resources for assessment	• This unit may be assessed in conjunction with other units that form part of the job role or function. • Elements of competence contain both knowledge and practical components. Knowledge components may be assessed off the job. Practical components should be assessed on the job or in a simulated work environment. • Evidence is best gathered using the products, processes and procedures of the individual workplace as the means by which

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EVIDENCE GUIDE	

	the candidate achieves industry competencies.
	• The following should be made available:
	  • a workplace or simulated workplace
	  • documentation, such as enterprise policy and procedure manuals relating to customer service, enterprise telephone directory, legislation and codes of practice
	  • a range of customers with different complex requirements (real or simulated)
	  • a communication system or a range of communication equipment
	  • real or simulated customer documents or database
	  • a qualified workplace assessor.

Method of assessment	It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover the varying circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Unit scope	Enterprises may vary in size, type and location, in the range of merchandise and services provided and in delivery policies
Customers	Customers may: • be regular or new • have special or unusual requests • be from a range of social, cultural or ethnic backgrounds and with different physical and mental abilities
Staff	Staff may be: • full-time, part-time or casual and vary in terms of training, product knowledge and staffing levels

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RANGE STATEMENT	
	• operating in routine or busy trading conditions
Complex customer requirements	Complex customer requirements may include, but are not limited to: • unusual or out of the ordinary problems, requirements of special or high importance customers, complex technical problems, matters involving more than one solution or area of service, needs of customers who have not been happy with some aspect of product or service provided or complex financial or insurance arrangements, such as lease, fleet or warranty extension arrangements
Information/documents	Information/documents may include: • enterprise policies and procedures relating to customer service, equipment and product manufacturer/component supplier specifications, enterprise operating procedures, legislative and regulatory requirements, industry/workplace codes of practice and customer requirements

Unit Sector(s)

Unit sector	Sales and Marketing

Co-requisite units

Not applicable.

Competency field

Competency field	Common

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AURACA3003 Build customer relations

Modification History

Release	Comment
Release 1	Replaces AURC362807A Build customer relations Unit code updated to meet policy requirements. Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence to establish customer needs, maintain a customer database and ensure appropriate treatment of customers. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit of competency applies to the following and should be contextualised to the qualification to which it is being applied: • retail, service and repair.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Ensure maintenance of customer database	1.1. Evidence of maintenance of customer documents is sought regularly from staff responsible to ensure vital data is kept on existing and potential customers 1.2. Customer data is maintained to ensure database relevance and currency 1.3. Information on customers and sales and service history is gathered for analysis
2. Establish needs of customer	2.1. Customer needs are regularly monitored through formal and informal communication channels 2.2. Current products and services are assessed against customer needs to determine the ability of the enterprise to meet customer needs 2.3. Trends in customer service needs are documented and reported to appropriate persons periodically for planning purposes
3. Ensure appropriate treatment of customer	3.1. Service standards are reviewed regularly against outcomes to ensure required standards are met 3.2. Staff are trained to provide customer service to an appropriate standard to ensure consistent treatment of customers 3.3. Work activities of staff are reviewed regularly to ensure customer requirements are met 3.4. Business operations are reviewed to ensure they meet current and projected customer requirements

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ELEMENT	PERFORMANCE CRITERIA
	3.5. Staff are actively involved in providing information to improve customer service operations and activities

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- collect, organise and understand information related to collating and analysing customer information to identify needs
- communicate ideas and information to conduct information sessions for staff
- plan and organise activities concerning information for database entries
- work with others and in a team by involving staff in improvements to customer service
- use mathematical ideas and techniques to plan database cells and size
- establish diagnostic processes which identify and recommend improvements to customer service
- use workplace technology related to use of customer database

Required knowledge

Knowledge of:

- enterprise policies and procedures in regard to:
  - customer service
  - maintenance of customer databases
  - dealing with difficult customers
  - allocated duties/responsibilities
- the range of enterprise merchandise and services, location of departments/sections and telephone extensions of departments/sections
- legislation and statutory requirements, including workplace health and safety (WHS) , consumer law, trade practices and fair trading legislation
- industry/workplace codes of practice in relation to customer service

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • maintaining relevant and current customer databases in accordance with enterprise policies and procedures • monitoring, reviewing and assessing customer needs and trends • ensuring appropriate treatment of customers. This unit may be assessed in conjunction with other units that form part of the job role or function.

Context of and specific resources for assessment	• Elements of competence contain both knowledge and practical components. Knowledge components may be assessed off the job. Practical components should be assessed on the job or in a simulated work environment.
	• Evidence is best gathered using the products, processes and procedures of the individual workplace as the means by which the candidate achieves industry competencies.
	• The following should be made available:
	  • a workplace or simulated workplace
	  • documentation, such as enterprise policy and procedure manuals relating to customer service, enterprise telephone directory, legislation and codes of practice
	  • computer, database software, customer information and enterprise policies and procedures
	  • a range of customers with different requirements (real or simulated)
	  • a communication system or a range of communication equipment
	  • real or simulated customer database
	  • a qualified workplace assessor.

Method of assessment	It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons, subject to agreed authentication arrangements.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Enterprises	Enterprises may vary in size, type and location, range of merchandise and services provided and delivery policies
Customers	Customers may: • be regular or new • have routine or special requests • be from a range of social, cultural or ethnic backgrounds and physical and intellectual abilities Regardless, all customers are made feel welcome, valued and, at the end of the process, satisfied. Customer contact may be: • face to face, by telephone, or electronic means or in writing
Customer service	Customer service may include all enterprise activities, internal and external customers and follow-up in event of delays in service provision
Staff	Staff may be: • full-time, part-time or casual and vary in terms of training, product knowledge and staffing levels • operating in routine or busy trading conditions
Customer needs	Customer needs may include: • information regarding available products or services, quality of products or services, complementary products or services, enterprise facilities and services or the location of specific items
Customer databases	Customer databases may include: • information on customer name, contact details, purchase history details of products or services, information requests, special needs and customer 'rating' by enterprise
Policies and procedures	Policies and procedures may include: • enterprise policies and procedures relating to customer service, equipment and product manufacturer/component supplier specifications, enterprise operating procedures, legislative and

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RANGE STATEMENT	
	regulatory requirements, industry/workplace codes of practice and customer requirements

Unit Sector(s)

Unit sector	Sales and Marketing

Co-requisite units

Not applicable.

Competency field

Competency field	Common

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AURAFA2004 Solve routine problems in an automotive workplace

Modification History

Release	Comment
Release 1	Replaces AURC252327A Identify, clarify and resolve problems Performance Criteria updated to reflect the automotive workplace

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes required to identify and clarify the nature of routine problems commonly encountered in an automotive workplace as they relate to automotive vehicle repair. It involves deciding on the best solution, implementing and evaluating solutions and assisting others to identify and resolve problems. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Application of the Unit

Application of the unit	Work applies to the process implemented when addressing a problem in relation to vehicle or equipment repair. This unit has application throughout all sectors of the automotive industry and can be applied to resource, equipment, job function, workplace environment or process related problems.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify and clarify nature of the problem	1.1. Signs of ***problems*** are identified or anticipated 1.2. ***Information and evidence*** is gathered from a variety of sources 1.3. Detailed analysis of the information is prepared, listing all options 1.4. Relevant and irrelevant components of the problem are distinguished within the available timeframe
2. Determine criteria for optimal solution and implement solution	2.1. Range of possible ***solution methods*** are defined 2.2. Options and strategies are identified or devised 2.3. Strengths and weaknesses of each option and strategy are considered against determined criteria 2.4. The optimal solution is determined 2.5. An implementation strategy is prepared and presented to designated persons for approval 2.6. The chosen solution is implemented within available timeframe
3. Evaluate and report on effectiveness of solutions and outcomes	3.1. Criteria are established to determine if chosen solutions resolve the problem 3.2. The chosen solution is evaluated against the determined

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	criteria 3.3. Follow-up procedures are implemented by investigating things that have gone wrong and developing ***contingency arrangements*** 3.4. The effectiveness of the solution is reported to the workgroup or designated persons
4. Assist others to identify, clarify and resolve problems in the workplace	4.1. Others are assisted to anticipate or identify the indicators of a problem 4.2. Others are assisted to investigate the problem 4.3. Others are assisted to devise and evaluate alternative options and strategies 4.4. Others are assisted to implement the chosen solution

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to communicate ideas and information relating to reading and understanding workplace documents
- initiative and enterprise to identify sources of information, assistance and expert knowledge to assist with problem solving
- literacy skills to:
  - understand written workplace procedures and documents
  - read and follow information in written instructions, specifications, standard operating procedures, charts and other applicable reference documents
- numeracy skills to use mathematical ideas and techniques where required for solution options
- planning and organising skills to plan and organise activities for a plan of action developed to solve problems
- problem-solving skills to:
  - recognise a workplace problem or a potential problem
  - adopt strategic approaches to routine problem solving
  - establish diagnostic processes that use basic analytical and problem-solving skills relating to identifying, evaluating and resolving work-related problems
  - refer problems outside area of responsibility to appropriate person and suggest possible causes
- self-management skills to:
  - select and use appropriate written materials, processes and procedures
  - recognise limitations and seek timely advice

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REQUIRED SKILLS AND KNOWLEDGE
• teamwork skills to work with others and in a team by using basic communication and teamwork skills to assist others to solve problems • technical skills to collect, organise and understand information relating to collating information to define problems • technology skills to use workplace technology for research and to report on effectiveness
Required knowledge
• workplace policies and work procedures in relation to problem identification and problem solving • problem identification, evaluation and reporting procedures • problem identification, evaluation and reporting practices and strategies

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to workplace operations and satisfy all of the requirements of the performance criteria and required skills and knowledge. A person who demonstrates competency in this unit must be able to: • communicate effectively with others involved in or affected by the work • identify indicators of problems or potential problems • gather and evaluate information relating to the problem • devise solutions • implement solutions as they relate to mechanical or electrical faults or problems in an automotive workplace.
Context of and specific resources for assessment	Competency is to be assessed in the workplace or a simulated workplace environment that accurately reflects performance in a real workplace setting. Assessment is to occur: • using standard workplace practices and procedures

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EVIDENCE GUIDE	
	• following safety requirements • applying environmental constraints. Assessment is to comply with relevant: • regulatory requirements • Australian standards • industry codes of practice. The following resources must be made available for the assessment of this unit: • workplace location or simulated workplace • documentation, such as workplace or sample policies and procedures, vehicle workshop or repair manuals related to work procedures and problem solving • vehicles with mechanical or electrical faults or problems requiring resolution.
Method of assessment	Assessment must satisfy the endorsed Assessment Guidelines of this Training Package. Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with the application of required skills and knowledge. Assessment methods must be by direct observation of tasks and include questioning on required skills and knowledge to ensure correct interpretation and application. Competence in this unit may be assessed in conjunction with other units which together form part of a holistic work role. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate the needs of diverse clients. Assessment processes and techniques must be culturally sensitive and appropriate to the language, literacy and numeracy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the

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RANGE STATEMENT	
performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Problems may include:	• problems relating to normal work activities within the responsibility of the individual or workgroup • problems that arise relating to additional or non-standard work activities • problems caused by internal or external changes in work conditions or the environment.
Information and evidence may include:	• equipment or product manufacturer and component supplier specifications • workplace policies and procedures • customer requirements • repair quotations • legislation and regulations • industry and workplace codes of practice.
Solution methods may include:	• personal problem solving • mathematical problem solving • root cause analysis • brainstorming • lateral thinking • trial and error • substitution.
Contingency arrangements may include:	• technical evaluation • physical evaluation • formulating or revising plans • strategy development • evaluating procedures • time management • cpmmunication strategies.

Unit Sector(s)

Competency field	Common
Unit sector	Foundation Skills

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Custom Content Section

Not applicable.

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AURAFA5007 Develop and document specifications and procedures

Modification History

Release	Comment
Release 1	Replaces AURT577620A Develop and document specifications and procedures Unit code updated to meet policy requirements. Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit covers the competence to analyse requirements and to develop and document technical specifications and procedures providing concise and unambiguous direction and guidance for workplace activities. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit covers the work involved in the research for and writing of specifications and procedures for the workplace. Work requires individuals to demonstrate conceptual ability, discretion, judgement and problem-solving skills. Work may involve individual and team related activities and will normally relate to the standard forms of activity performed in the enterprise and industry.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify requirements	1.1. Information required for technical specifications and procedures is identified and assembled. 1.2. Specifications and procedures requirements and formats are established and confirmed, where necessary. 1.3. Requirements for information entry, storage, output and quality of document production are identified in accordance with enterprise procedures. 1.4. Specifications and procedures document design is appropriate for efficient entry of information and satisfies appearance and presentation requirements for the purpose of the document. 1.5. Range of functions incorporated in the document design reflects the nominated requirements.
2. Prepare specifications	2.1. Technical information for use in the specification is collected, tested and validated or confirmed before use. 2.2. Authoritative sources and references are identified and used in the preparation and presentation of the specification. 2.3. Specifications are written in a format, to ensure requirements can be met.

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ELEMENT	PERFORMANCE CRITERIA
	2.4. Specifications are written in a manner that is clear and understood in the workplace. 2.5. Specification documentation satisfies enterprise and industry standards.
3. Prepare technical procedures	3.1. Activities and tasks are identified, analysed and documented. 3.2. Activities and tasks are sequenced and logically grouped. 3.3. Procedures are documented to enterprise and industry standards.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- collect, organise and understand technical information related to the specifications and procedures, testing processes, diagnostic methods and options and safety procedures.
- communicate ideas and information to ensure the completeness, clarity and comprehension of the specifications and procedures by the target audience.
- plan and organise to avoid backtracking, workflow interruptions or wastage.
- work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity.
- use mathematical ideas and techniques to incorporate measurements, calibration and test requirements into specifications and procedures.
- establish processes which anticipate and allow for risks, cater for both direct and indirect causes, avoid or minimise reworking and avoid wastage in the preparation and content of procedures.
- use the workplace technology related to document preparation, including calculators and measuring devices, computing systems and information management systems.

Required knowledge

- technical writing and presentation techniques.
- enterprise (or equivalent) technical procedure formats, content rules, preparation and management techniques.

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	

Critical aspects for assessment and evidence required to demonstrate competency in this unit	• Locate, interpret and apply information.
	• Apply safety requirements throughout the work sequence, including the use of personal protective clothing and equipment.
	• Identify and itemise steps and stages in procedures.
	• Complete a significant operational procedure, incorporating safety obligations, and covering:
	  • a full analysis of the topic area
	  • a step-by-step operational procedure
	  • supporting documents to the procedure.
	• Complete or review and update a specification for a significant system or sub-system covering:
	  • system/sub-system description
	  • components
	  • materials
	  • construction
	  • circuitry
	  • related information sources
	  • legal, regulatory or intellectual property law requirements.
	• Modify products to cater for variations in workplace cultures and environment.
	• Work effectively with others.

Context of, and specific resources for assessment	Assessment may occur on the job or in a workplace simulated facility. Access to systems requiring specification, activities requiring procedural coverage, related, technical information and a work environment.
Method of assessment	Assessment of this unit of competence is most likely to be project related and require portfolios or other forms of indirect evidence of process. Direct evidence will include certification of compliance of the final outcome/product or authorisation for use by a competent authority. Assessment must confirm the inference that competence is able not

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EVIDENCE GUIDE	
	only to be satisfied under the particular circumstances, but is able to be transferred to other projects. Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Specifications	Specifications are technical criteria for an object, item, system or sub-system describing the components, materials, construction, circuitry and associated legal, regulatory or intellectual property issues.
Procedures	Procedures contain detailed descriptions of the tasks, activities, sequences, materials, tooling, rules and safety requirements leading or guiding an individual through an authorised work practice.
Function	The function is undertaken in accordance with established enterprise procedures and practices may include requirements recommended by manufacturer.
Unit context	• WHS requirements include legislation, safety management systems, hazardous substances and dangerous goods codes and safe operating procedures. • Work is carried out in accordance with legislative obligations, environmental legislation, health regulations, authorised handling procedures and organisation insurance requirements.
Workplace environment	Specifications and procedures may be used in established workshops or under external site conditions.
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices.
Information and procedures	• Workplace procedures relating to the use of tooling and equipment. • Workplace procedures relating to reporting and communication.

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RANGE STATEMENT	
	• Manufacturer/component supplier specifications and application procedures for testing equipment and materials. • Manufacturer/component supplier specifications, schematics and operational procedures related to systems. • Australian Design Rules. • Vehicle industry regulations. • Vehicle industry publications related to emerging system technology and technology changes.

Unit Sector(s)

Unit sector	Common

Co-requisite units

Not applicable.

Competency field

Competency field	Foundation Skills

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AURAKA3002 Adapt work processes to new technologies

Modification History

Release	Comment
Release 1	Replaces AURC361101A Adapt work processes to new technology Unit code updated to meet policy requirements. Minor changes to unit title Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence required to investigate the nature of new technologies and modify existing work processes and procedures to incorporate new technologies into the workplace. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Investigate the nature of the new technology	1.1. Training/information sessions are attended, to gain a full understanding of new technology 1.2. Technical sources are consulted to gain a full understanding of new technology 1.3. New technologies are analysed to determine their importance and value to the enterprise 1.4. Impact of new technologies on existing processes is analysed 1.5. Information about additional materials and equipment required to adopt the technology is communicated to staff
2. Modify existing work processes and procedures	2.1. Processes are modified to incorporate new technologies 2.2. Impact on workflow and productivity is minimised through effective planning and communication with staff 2.3. Staff are provided with training/information in the use of new technologies

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE
Required skills
• collect, organise and understand information related to adapting work processes to new technologies • communicate ideas and information to supervisors related to adapting work processes to new technologies • plan and organise activities adapting work processes to new technologies • work with others and in a team by seeing and conveying information related to the planning, sequencing and completion of the task • use mathematical ideas and techniques to count and measure • establish diagnostic processes which adapts work processes to new technologies • use the workplace technology related to adapting work processes to new technologies
Required knowledge
Knowledge of: • enterprise existing activity, processes and procedures relevant to application • cost-benefit analysis principles • analytical skills, processes and procedures • planning, communication and management skills, processes and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • investigating the nature of new technologies and modifying existing work processes and procedures to incorporate new technologies into the workplace.
Context of and specific resources for assessment	• Underpinning knowledge and skills may be assessed on or off the job. • Assessment of practical skills must take place only after a period of supervised practice and repetitive experience. If workplace conditions are not available, assessment in simulated

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EVIDENCE GUIDE	
	workplace conditions is acceptable. • Prescribed outcome must be able to be achieved without direct supervision. • The following should be made available: • technical information, hand tooling, specialised tooling and equipment.
Method of assessment	Practical assessments: • research and adapt a process to a previously unknown technology • train staff in use of a new technology • compare costs and benefits of a current process and one which incorporates a new technology • make a recommendation as to whether a given technology should be introduced to the workplace, taking into consideration the value to the enterprise of the change • plan and implement the introduction of a new technology into the workplace, with provision to minimise the impact on workflow and productivity.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Methods	Methods include: • analysis of existing work practices • planning • communication • research
Processes which may be modified	Processes which may be modified could include: • work/repair sequence • WHS practices • administration and/or documentation • stock control

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RANGE STATEMENT	
New technologies	New technologies which could be incorporated into the workplace include: • new equipment or tooling, base materials or automotive systems
Unit context	Workplace example: • a body repair involving a multi-layer paint system is encountered for the first time in the workshop. The technician contacts the paint supplier to gather information on the paint system. Other persons might also need to be contacted to gain an understanding of how to effect the repair, such as the paint manufacturer or industry contacts who may have encountered such a paint system before and/or employer bodies. Because normal 'blending' is not possible, alternative methods for colour matching need to be determined after gathering information
Information/documents	Information/documents may include: • manufacturer/component supplier specifications • technical journals, including workshop • manuals, tune-up manuals • enterprise operating procedures • customer requirements • industry codes of practice • legislation
WHS requirements	WHS requirements may include: • state/territory WHS legislation • award provisions

Unit Sector(s)

Unit sector	Common

Co-requisite units

Not applicable.

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Competency field

Competency field	Information Technology

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AURALA3001 Determine legal aspects of an automotive service and repair contract

Modification History

Release	Comment
Release 1	Replaces AURA354616A Determine legal aspects of an automotive service and repair contract Unit code updated to meet policy requirements. Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence to act within legal and ethical boundaries in dealing with customers and implement measures to avoid disputes and resolve those that do occur. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit of competency applies to the legal and ethical operation in retail, service and repair. Methods include: • written and verbal communication • researching requirements • monitoring performance against requirements • ensuring currency of requirements • documentation.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Comply with service and repair contract and agreement legislation	1.1. Identify and comply with the rights and legal obligations of parties involved in a valid service and repair contract 1.2. Identify and comply with the legal liabilities of a repairer who performs service or repair work without a valid contract 1.3. Prepare draft documents that would form a valid contract for service and repair work in the automotive industry 1.4. Implement procedures to advise customers of the nature of the contract they are entering into requesting service and repair work to be undertaken 1.5. Implement procedures for staff to follow to ensure valid contracts are in place for all stages of work undertaken 1.6. Implement procedures to minimise liability or customer claims in relationship to bailment 1.7. Identify which regulatory bodies have authority to inspect the premises and the procedures for this to occur
2. Establish warranties in accordance with legal requirements and company policy	2.1. Ensure customer statutory rights have been protected 2.2. Ensure warranty documents have regard for fair trading principles 2.3. Ensure warranty interpretation is in accordance with company policy

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ELEMENT	PERFORMANCE CRITERIA
3. Enforce contract in accordance with legal requirements and company policy	3.1. Develop company policy on payment terms for services rendered 3.2. Identify and observe different forms of liens and their applicability of the automotive industry 3.3. Identify and observe the legal rights and obligations of an automotive business in respect of the disposal or sale of uncollected vehicles or goods 3.4. Outline the legal procedure that should be followed for recovery of payment when a customer is in default of payment
4. Dispute resolution in the automotive industry	4.1. Implement procedures to minimise disputes with customers 4.2. Maintain necessary records to support positions in disputes with customers 4.3. Identify external sources of assistance in dispute resolution 4.4. Monitor customer disputes and resolutions to implement procedures for avoidance strategies

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- collect, organise and understand information related to legal and ethical business dealings
- communicate ideas and information to customers and supervisors related to legal and ethical business dealings
- plan and organise activities related to legal and ethical business dealings
- work with others and in a team by observing and conveying information related to planning, sequencing and completion of the task
- use mathematical ideas and techniques to count and measure
- establish and utilise processes that identify appropriate methods related to legal and ethical business dealings
- use workplace technology related to legal and ethical business dealings

Required knowledge

- legal and ethical requirements related to contracts
- warranty rights and responsibilities of suppliers and repairers
- components of a valid contract

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REQUIRED SKILLS AND KNOWLEDGE
• written communication and report writing skills procedures • oral communication skills procedures • assessing vehicle damage and recommended repair methods • dispute resolution techniques

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer the competence to changing circumstances and to respond to unusual situations in critical aspects of: • establishment and revision of model customer contracts • implementation procedures to avoid or deal with customer disputes • maintenance of customer records • identification of key components of a valid service and repair contract • establishment of an appropriate paper trail and records to verify actions taken in a dispute situation.
Context of and specific resources for assessment	• Underpinning knowledge may be assessed on or off the job. • Assessment of practical skills must take place only after a period of supervised practice and repetitive experience. Assessment must take place in the workplace. • The prescribed outcome must be able to be achieved without direct supervision.
Method of assessment	

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Resources	Resources may include: • enterprise stationery, telephone and appropriate forms/business documents • repair orders, job cards and invoices • sample repair contracts • computer, calculator and software • customer records
Information/documents	Sources of information/documents may include: • consumer legislation and regulation, including sections of the Trade Practices Act • enterprise operating procedures • product manufacturer/component supplier specifications and warranties • customer requirements • industry/workplace codes of practice • state/industry WHS legislation • contract law information relevant to automotive business • company policy on payment terms • industry association code of ethics

Unit Sector(s)

Unit sector	Common

Co-requisite units

Not applicable.

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Competency field

Competency field	Regulatory or Legal

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AURAMA3004 Maintain business image

Modification History

Release	Comment
Release 1	Replaces AURC363337A Maintain business image Unit code updated to meet policy requirements. Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence required to maintain staff dress and grooming standards, maintain the physical appearance of the workplace, implement waste disposal processes, and promote business products and services. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit of competency applies to the following and should be contextualised to the qualification to which it is being applied: • retail, service and repair.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Maintain physical appearance of the workplace	1.1. Cleanliness and tidiness of the workplace is maintained in accordance with industry and/or enterprise standards of workplace health and safety (WHS) 1.2. Workplace is free of rubbish and waste in accordance with industry, WHS and enterprise requirements 1.3. Standards of cleanliness are communicated to staff in accordance with enterprise procedures 1.4. Customer reception area is maintained to enterprise standards 1.5. Defined areas for specific tasks are created and maintained to enterprise requirements 1.6. Facilities and equipment maintenance is planned and regularly carried out 1.7. Enterprise image and signage is displayed consistently throughout the organisation
2. Maintain enterprise dress and grooming standards	2.1. Expectations regarding dress and grooming are communicated to staff on a regular basis 2.2. Standards are updated as needs arise according to enterprise requirements 2.3. Dress and grooming of staff are monitored to ensure standards are met 2.4. Breaches of standards are identified and corrected
3. Implement waste disposal processes	3.1. Waste disposal is monitored to ensure compliance with environmental, WHS, industry and enterprise requirements

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ELEMENT	PERFORMANCE CRITERIA
	3.2. Recycling opportunities are identified and implemented in accordance with environmental legislative, industry and enterprise standards 3.3. Environment Protection Authority documents are maintained
4. Promote products and services provided by the business	4.1. Promotional activities are implemented as planned according to enterprise policies and industry and legal requirements 4.2. Products/services are sold to highest quality level according to enterprise policies, manufacturer/component supplier specifications, industry and legal requirements 4.3. Sales promotions/campaigns are actively supported

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- collect, organise and understand information related to enterprise expectations
- communicate ideas and information to ensure staff are advised of enterprise requirements
- plan and organise activities for waste disposal processes
- work with others and in a team by using a team approach to maintain workplace appearance
- use mathematical ideas and techniques to budgets associated with sales campaigns
- establish diagnostic processes to resolve environmental issues
- use the workplace technology related to promote products and services

Required knowledge

Knowledge of:

- WHS requirements within the state/territory of operation
- industry and enterprise standards and requirements regarding physical appearance of the workplace, dress and grooming
- industry and enterprise standards regarding waste disposal processes
- enterprise standards regarding promotion of services and products
- environmental protection authority regulations and guidelines
- advertising codes and requirements for ethical advertising practices
- legal obligations and requirements

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • maintaining staff dress and grooming standards • maintaining the physical appearance of the workplace • implementing waste disposal processes • promoting business products and services.

Context of and specific resources for assessment	• The underpinning knowledge and skills may be assessed on or off the job.
	• The assessment of practical skills must take place only after a period of supervised practice and repetitive experience. If workplace conditions are not available, assessment in simulated workplace conditions is acceptable.
	• The prescribed outcome must be able to be achieved without direct supervision.
	• The following should be made available:
	  • a workplace or simulated workplace
	  • enterprise or equivalent policy and procedures
	  • enterprise stationery, forms/business documents
	  • a qualified workplace assessor.

Method of assessment	Practical assessments: • address staff breaches of dress and grooming standards • complete Environmental Protection Authority (EPA) paperwork • maintain the physical appearance of the worksite • maintain enterprise dress and grooming standard • implement waste disposal processes • promote products and services provided by the business.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Methods	Methods include: • written and verbal communication
Defined areas for specific tasks	Defined areas for specific tasks may include: • lunchrooms • work areas for specific tasks (e.g. paint, electrical, transmission and wheel alignment) • warehouse areas • office/administration areas • workshop bays
Waste	Waste may include: • materials • products • parts • consumables
Corrective actions	Corrective action to breaches of dress and grooming standards may include: • individual or group staff counselling, notices or memos
Standard clothing	Standard clothing may include: • overalls • shirts • jacket • trousers • work safety or waterproof footwear • ear plugs/muffs • safety goggles • other personal protection equipment
Information/documents	Information/documents may include: • enterprise operating procedures • product manufacturer/component supplier specifications • customer requirements

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RANGE STATEMENT	
	• industry/workplace codes of practice
WHS requirements	WHS requirements may include: • state/territory industry WHS legislation • award provisions

Unit Sector(s)

Unit sector	Common

Co-requisite units

Not applicable.

Competency field

Competency field	Management, Leadership and Supervision

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AURAMA4005 Manage complex customer issues

Modification History

Release	Comment
Release 1	Replaces AURC463238B Manage complex customer issues Unit code updated to meet policy requirements. Reference to OHS legislation replaced with new WHS legislation

Unit Descriptor

Unit descriptor	This unit of competency describes the skills and knowledge required to resolve complex customer complaints or issues. It requires the ability to communicate effectively and make an informed judgement. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Application of the Unit

Application of the unit	This unit applies to individuals who are required to manage and resolve complex customer issues in an automotive environment.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Examine the nature of the issue	1.1. Ascertain all facts relating to the issue 1.2. Use effective communication to understand customer feelings and opinions 1.3. Determine enterprise and/or supplier policies relating to the issue
2. Exercise judgement to resolve the issue	2.1. Determine implications of the issue for the customer and organisation 2.2. Analyse and negotiate options for resolution with the customer in accordance with legislative requirements and enterprise policies 2.3. Refer matters for which a solution cannot be negotiated to management
3. Document issue and outcome	3.1. Report outcome of the issue to management 3.2. Incorporate issue and outcome into customer feedback system

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • technical skills to the level required to use workplace technology to manage, resolve and

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REQUIRED SKILLS AND KNOWLEDGE
record customer issue • communication skills to the level required to listen effectively to a customer complaint, negotiate effectively to resolve the issue and communicate effectively with the supervisor and other workers, and to relate to people from a range of social, cultural and ethnic backgrounds, and of varying physical and mental abilities • literacy skills to the level required to identify and understand information related to the issue, the enterprise procedures to resolve issues, and to prepare a report on the issue and outcome • numeracy skills to the level required to undertake any calculations related to the complex issue management • problem-solving skills to the level required to undertake diagnostic processes that lead to a solution to the complex customer complaint • team skills to the level required to seek advice from others to lead to a solution to the complex customer issues
Required knowledge
Required knowledge includes: • negotiation and problem-solving strategies • industry codes of conduct • applicable commonwealth, state or territory legislation, regulations, standards and codes of practice, including workplace health and safety (WHS), personal safety and environment, relevant to resolving complex customer complaints • organisational policies and procedures, including quality requirements, reporting and recording procedures, and work organisation and planning processes, related to resolving complex customer complaints

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • observe safety procedures and requirements • communicate effectively with others involved in or affected by the work • select methods and techniques which are appropriate to the

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EVIDENCE GUIDE	
	circumstances • understand and follow enterprise procedures to resolve customer complaints • use a planned approach to resolve the complaint • determine the facts and implications of the issue for both the customer and the organisation • resolve the customer complaint to the satisfaction of both the customer and the enterprise • document the resolved issue according to workplace procedures.

Context of and specific resources for assessment	• The application of competency is to be assessed in the workplace or a simulated environment that reflects as far as possible the actual working environment.
	• Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints.
	• Assessment is to comply with relevant regulatory requirements, including specified Australian standards.
	• Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
	• The following resources should be made available:
	  • details of a range of complex customer complaints
	  • workplace procedures related to customer service
	  • legislation and codes of practice
	  • computer hardware and software, calculators and general office equipment.

Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of this Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of Required Skills and Knowledge. • Assessment methods must be by direct observation of tasks and include questioning on Required Skills and Knowledge to ensure its correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Competence in this unit may be assessed in conjunction with

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EVIDENCE GUIDE	
	other functional units which together form part of the holistic work role.
Guidance information for assessment	Assessment processes and techniques must be culturally sensitive and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Complex issues	Complex issues may include: • cost issues • warranty issues • policy matters • commercial decisions taken • code of practice adherence • work standards • time taken or time expected to repair • selection of parts
Options for resolution	Options for resolution may include: • rework • reduced fee for work completed/agreed • additional services for free/reduced fee • referrals to other suppliers
Workplace procedures	Workplace procedures may include: • customers issue resolution process and procedures • industry and workplace codes of practice • product manufacturer and component supplier specifications • industry and workplace codes of practice

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RANGE STATEMENT	
Legislative requirements	Legislative requirements are to be in accordance with applicable commonwealth, state or territory legislation, regulations, certification requirements and codes of practice, and may include: • award and enterprise agreements • industrial relations • Australian standards • Australian Design Rules • confidentiality and privacy • WHS • the environment • equal opportunity • anti-discrimination • duty of care
WHS requirements	WHS requirements are to be in accordance with applicable commonwealth, state or territory legislation and regulations, and organisational safety policies and procedures, and may include: • personal protective equipment and clothing • safety equipment • first aid equipment • hazard and risk control • elimination of hazardous materials and substances • manual handling, including shifting, lifting and carrying • emergency procedures • road rules • safe driving policy
Environmental requirements	Environmental requirements may include: • waste management • noise • dust • clean-up management
Organisational policies and procedures	Organisational policies and procedures may include: • quality policies and procedures, including Australian standards • WHS, sustainability, environment, equal

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RANGE STATEMENT	
	opportunity and anti-discrimination • manufacturer specifications and industry codes of practice • safe work procedures • reporting and recording procedures

Unit Sector(s)

Unit sector	Common

Co-requisite units

Not applicable.

Competency field

Competency field	Management, Leadership and Supervision

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AURAMA5006 Contribute to business improvement

Modification History

Release	Comment
Release 1	Replaces AURC561614A Contribute to business improvement Unit code updated to meet policy requirements. Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence required to contribute to the budget process, manage expenses in order to maintain levels of profitability within the specific area of responsibility, and contribute to the planning of business promotions. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit of competency applies to the following and should be contextualised to the qualification to which it is being applied: • retail, service and repair.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Contribute to the setting of budgets and targets	1.1. Information for budgets and targets is collected within agreed timeframes 1.2. Budget and targets are set to achieve required levels of financial and business performance 1.3. Hourly rate is calculated based on business costs and margins, according to enterprise requirements 1.4. Expenditure requirements are agreed with appropriate persons, and provision is made in targets 1.5. Provision for unplanned costs is included in annual budget
2. Manage income and expenses	2.1. Expenditure and income for jobs is monitored on a regular basis 2.2. Financial information on jobs is collected on a regular basis and compared to budget 2.3. Corrective action for budget discrepancies is implemented 2.4. Invoices are prepared within timeframes according to industry and/or enterprise standards 2.5. Performance against budgets is monitored on a regular basis, and options for corrective action are discussed with management 2.6. Assistance is provided in the resolution of disputed accounts according to industry and/or enterprise standards and procedures for dispute resolution
3. Contribute to planning of business promotions	3.1. Promotional strategies are regularly reviewed with management

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ELEMENT	PERFORMANCE CRITERIA
	3.2. Adjustments to promotional strategies are discussed and agreed with management 3.3. New stock and/or display equipment required to support promotions is identified and arranged in a timely fashion 3.4. Displays are arranged to enhance enterprise image

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- collect, organise and understand information related to contributing to business improvement
- communicate ideas and information to customers and supervisors related to contributing to business improvement
- plan and organise activities related to contributing to business improvement
- work with others and in a team by seeing and conveying information related to the planning, sequencing and completion of the task
- use mathematical ideas and techniques to count and measure
- establish diagnostic processes which identify methods related to contributing to business improvement
- use the workplace technology related to contributing to business improvement

Required knowledge

Knowledge of:

- accounting principles
- how to set a budget
- hourly rate components, based on general industry models/formulas
- responses to a range of budget and target situations in the workplace
- marketing concepts and principles

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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EVIDENCE GUIDE	
Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • contributing to the budget process, managing expenses in order to maintain levels of profitability within the specific area of responsibility, and contributing to the planning of business promotions.
Context of and specific resources for assessment	• Underpinning knowledge and skills may be assessed on or off the job. • Assessment of practical skills must take place only after a period of supervised practice and repetitive experience. If workplace conditions are not available, assessment in simulated workplace conditions is acceptable. • Prescribed outcome must be able to be achieved without direct supervision. • The following should be made available: • enterprise stationery, telephone, forms/business documents.
Method of assessment	Practical assessments: • calculate and review hourly rate, based on supplied business costs and margins • discuss current budget status, based on provided data • achieve department budgets • discuss strategy for treatment of debtors and bad debts • prepare analysis of current enterprise/department promotional strategies and recommendations for adjustments.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Methods	Methods include: • written and verbal communication • planning
Budgets and targets	Budgets and targets may be for: • finances • sales • stock throughput • work won
Financial information	Financial information may include: • hourly rate components • expenditure on jobs, at hourly rate • income from jobs, at hourly rate • supplier invoices • stock documents
Unplanned costs	Unplanned costs may include: • accident • burglary/loss • damage
Business or department income	Business or department income may be sourced from: • retail labour sales • component sales • accessories and other items • margins on sublet jobs • government employment incentives
Business costs and margins	Business costs and margins may include: • general expenses • fixed expenses • on costs • rework component • profit margins
Corrective action	Corrective action in response to budget discrepancies may include: • reassessing budget • reducing costs • changing procedures
Business promotions	Business promotions may relate to:

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RANGE STATEMENT	
	• regular advertising • special campaigns
Displays	Displays may include: • stock and other merchandise • enterprise signage • promotional and advertising material
Information/documents	Information/documents may include: • enterprise operating procedures • product manufacturer/component supplier specifications • customer requirements • industry/workplace codes of practice
WHS requirements	WHS requirements may include: • state/territory WHS legislation • award provisions

Unit Sector(s)

Unit sector	Common

Co-requisite units

Not applicable.

Competency field

Competency field	Management, Leadership and Supervision

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AURANN4001 Prepare a vehicle repair quotation

Modification History

Release	Comment
Release 1	Replaces AURC465349B Prepare a vehicle repair quotation Unit code updated to meet policy requirements. Reference to OHS legislation replaced with new WHS legislation

Unit Descriptor

Unit descriptor	This unit of competency describes the skills and knowledge required to prepare a written vehicle repair quotation. It requires the ability to use numeracy and literacy skills to identify and document the costs. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Application of the Unit

Application of the unit	This unit applies to individuals who are required to prepare vehicle repair quotations in the vehicle repair and vehicle loss assessing industries. Vehicles may include light vehicles, heavy vehicles, agricultural and plant equipment, recreational boats, recreational vehicles and motorcycles.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Gather information	1.1. Clarify the particular service required 1.2. Locate information sources 1.3. Gather any job cost estimation and calculation details 1.4. Obtain labour unit cost projections 1.5. Identify enterprise quotation elements and procedures
2. Estimate, cost and prepare vehicle repair quotation	2.1. Estimate and cost required parts and materials 2.2. Estimate and cost direct labour and subcontractor services 2.3. Estimate and cost overheads and mark-up percentages in accordance with enterprise procedures 2.4. Note potential quotation variations 2.5. Prepare a legible and accurate quotation using the enterprise approved format 2.6. Verify final costs, calculations and other details with relevant enterprise person
3. Present quotation to customer	3.1. Present verbal and written report to customer 3.2. Gain approval to complete repairs from customer 3.3. Complete documentation and file quotation as required by enterprise

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- technical skills to the level required to use the internet and other workplace technology related to preparing a vehicle repair quotation
- communication skills to the level required to verify costs with others, to report work outcomes and problems, and to relate to people from a range of social, cultural and ethnic backgrounds, and of varying physical and mental abilities
- literacy skills to the level required to undertake costing research and to document and report findings
- numeracy skills to the level required to estimate and calculate labour, materials and on-costs and to validate work costs
- problem-solving skills to the level required to anticipate costing problems and to avoid reworking, wastage, and planning and scheduling problems
- team skills to the level required to work effectively and cooperatively with others to optimise workflow and productivity

Required knowledge

Required knowledge includes:

- methods and processes for identifying, apportioning, summarising and validating total costs for work
- components of labour costs
- current assessing and quoting methodologies
- commercial approaches to warehousing and physical distribution and costing
- manufacturer and component supplier specifications and manuals, including costing catalogues
- applicable commonwealth, state or territory legislation, regulations, standards and codes of practice, including workplace health and safety (WHS), personal safety and environment, relevant to calculating vehicle repairs
- organisational policies and procedures, including quality requirements, reporting and recording procedures, related to calculating vehicle repair costs

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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EVIDENCE GUIDE	
Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • observe safety procedures and requirements • communicating effectively with others involved in or affected by the work • select appropriate methods and techniques • interpret proposals, specifications and instructions for the work • obtain information relevant to the determination of costs • calculate and cost accurately the quantities of parts and materials, the amount of labour and time required to complete the work and overheads for a range of vehicle repair quotes • document the process and outcomes in accordance with enterprise practice.

Context of and specific resources for assessment	• The application of competency is to be assessed in the workplace or a simulated environment that reflects as far as possible the actual working environment.
	• Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints.
	• Assessment is to comply with relevant regulatory requirements, including specified Australian standards.
	• Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
	• The following resources should be made available:
	  • vehicles requiring repair that can be used for quotations
	  • appropriate worksite and costing details
	  • manufacturer and component costs, labour rates, commercial and industry information
	  • Repair Times manuals
	  • equipment, including calculators, computer, internet and software
	  • enterprise procedures.

Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of this Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of Required Skills and Knowledge.

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EVIDENCE GUIDE	
	• Assessment methods must be by direct observation of tasks and include questioning on Required Skills and Knowledge to ensure its correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.
Guidance information for assessment	Assessment processes and techniques must be culturally sensitive and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Quotation	Quotation may include: • customer details • vehicle details • work to be performed • details of costs, including labour • legible and accurate documentation using the enterprise-approved format
Overhead costs	Overhead costs may include: • rental and leasing costs • utilities • non-production resources • depreciation of plant and equipment • warehousing margins

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RANGE STATEMENT	
	• warehousing costs • insurance and other costs incurred by doing business • material/supply costs, including catalogues, contracts, standing agreements, market rates and warehousing margins
Information/documents	Information/documents may include: • Motor Vehicle Insurance and Repair Industry Code of Conduct • verbal, written and graphical instructions • parts listing prices and catalogues • inventory systems • material safety data sheets (MSDS) • diagrams or sketches • safe work procedures for inspection of vehicles for saleable components • engineer's design specifications and instructions • workplace specifications and requirements • instructions issued by authorised enterprise or external persons • Australian standards • current driver's licence
Legislative requirements	Legislative requirements are to be in accordance with applicable commonwealth, state or territory legislation, regulations, certification requirements and codes of practice, and may include: • award and enterprise agreements • industrial relations • Australian standards • Australian Design Rules • confidentiality and privacy • WHS • the environment • equal opportunity • anti-discrimination • duty of care
WHS requirements	WHS requirements are to be in accordance with applicable commonwealth, state or territory legislation and regulations, and organisational safety policies and procedures, and may include: • personal protective equipment and clothing • safety equipment • first aid equipment • hazard and risk control • elimination of hazardous materials and substances

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RANGE STATEMENT	
	• manual handling, including shifting, lifting and carrying • emergency procedures • road rules • safe driving policy
Environmental requirements	Environmental requirements may include: • waste management • noise • dust • clean-up management
Organisational policies and procedures	Organisational policies and procedures may include: • financial management policies and procedures • cost and apportioning overheads policies and procedures • labour employment costs, including awards and contracts • quality policies and procedures, including Australian standards • WHS, sustainability, environment, equal opportunity and anti-discrimination • manufacturer specifications and industry codes of practice • safe work procedures • reporting and recording procedures

Unit Sector(s)

Unit sector	Common

Co-requisite units

Not applicable.

Competency field

Competency field	Loss Assessment or Repair Quoting - Body

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AURATA3005 Estimate complex jobs

Modification History

Release	Comment
Release 1	Replaces AURC365722A Estimate complex jobs Unit code updated to meet policy requirements. Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence required to estimate the time requirements for complex jobs, source requirements, gather cost estimates from external service providers and document quotations. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit of competency applies to retail, service and repair complex estimation work within the repair sector of the automotive industry. Work requires individuals to demonstrate discretion, judgement and problem-solving skills in managing own work activities and contributing to a productive team environment. Competence may be demonstrated in a workplace environment or simulated workplace.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Estimate time requirements for jobs	1.1. Time estimates for job requirements are calculated based on warranty times, staff estimates, standard service/repair times, specifications, and subcontracted timeframes 1.2. Service/repair times are estimated and compared to documented estimate to ensure repair job is viable 1.3. Turn-around times for work completed by subcontractor are incorporated into total time estimates
2. Source parts	2.1. Viability of replacement compared to repair is ascertained to meet quality standards and legal requirements 2.2. Part requirements are determined to ensure cost constraints are met 2.3. Parts and consumables required for the job are ordered 2.4. Parts are sourced externally when internal stock is not available to meet customer requirements
3. Identify subcontract testing and/or service/ repair work costs for incorporation into the total estimated cost	3.1. Estimate is documented 3.2. Service/repair requirements, procedures and costs are documented in a logical order 3.3. Service/repair requirements are documented in detail 3.4. Estimate is relevant to the identified service/repair

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ELEMENT	PERFORMANCE CRITERIA
	requirements 3.5. Potential variations are noted on the estimate
4. Estimate total job costs	4.1. External service providers are given a clear outline of the work and time requirements of the job 4.2. Job cost estimate is documented and agreed with external service providers 4.3. Parts and consumables are costed according to industry and/or enterprise pricing standards 4.4. Supplementary estimate is prepared, to gain authorisation from owner for additional service/repairs 4.5. Final estimate is documented 4.6. Authorisation is gained from customer to commence work and/or undertake supplementary work
5. Report estimations to customer	5.1. Report of findings is completed in the enterprise-approved format 5.2. Customer is advised of the estimation 5.3. Job card is completed and delivered to appropriate persons

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- research and interpretive skills sufficient to locate, interpret and apply manufacturer/component supplier procedures, workplace policies and procedures
- analytical skills required for the identification and analysis of technical information
- plain English literacy and communication skills in relation to dealing with customers and team members
- questioning and active listening skills for example when obtaining information from customers
- oral communication skills sufficient to convey information and concepts to customers
- as applied to own work activities, including making good use of time and resources, sorting out priorities and monitoring own performance
- interacting effectively with other persons both on a one-to-one basis and in groups, including understanding and responding to the needs of a customer and working effectively as a member of a team to achieve a shared goal
- use mathematical ideas and techniques such as number and space and techniques, e.g. estimation and approximation, for practical purposes

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REQUIRED SKILLS AND KNOWLEDGE
• apply problem-solving strategies in purposeful ways, both in situations where the problem and the desired solution are clearly evident and in situations requiring critical thinking and a creative approach to achieve an outcome • combine the physical and sensory skills needed to operate equipment with understanding of scientific and technological principles needed to explore and adapt systems
Required knowledge
Knowledge of: • WHS regulations/requirements, equipment, material and personal safety requirements • principles of estimating and job costing • enterprise quality procedures • work organisation and planning processes • contract law • sale-contracting principles • written communication and report writing skills procedures relevant to application • oral communication skills procedures relevant to application

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • estimating in accordance with workplace requirements • estimation is carried out to manufacturer/component supplier requirements • estimation of the work completed within workplace timeframes

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EVIDENCE GUIDE	
	• report presented to customer is in compliance with workplace requirements.

Context of and specific resources for assessment	• This unit will normally need to be assessed as a discrete entity. Performance may involve the application of a range of contributory competencies.
	• Assessment of this unit must be completed on the job or in a simulated work environment which reflects a range of quality processes and procedures.
	• The prescribed outcome must be able to be achieved without direct supervision.
	• The competence should be assessed within the context of the qualification being sought.
	• The following should be made available:
	  • a workplace or simulated workplace
	  • enterprise stationery, telephone and forms/business documents
	  • repair order, job cards and quotes/estimates
	  • computer and software, calculator
	  • hand tooling, workshop equipment
	  • access to information

Method of assessment	It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements. Evidence of being able to: • access, interpret and apply service information • identify estimating and job costing procedures • accurately estimating time required for a job involving sublet work and/or a mix of service/repair disciplines (e.g. mechanical, electrical and body) • estimate on a wide variety of jobs, including non-routine jobs • justify a repair job deemed to be 'viable' from a cost perspective • justify a replacement/repair decision according to quality standards and legal requirements • use service tooling and equipment • observe safety procedures and requirements • provide customer service • prepare service reports • communicate with customers orally and in writing • maintain workplace documents.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Variables	Variables may include: • jobs involving subcontracted work • jobs involving a mix of vocations (e.g. mechanical, body and electrical) • non-routine jobs
Methods	Methods include: • written and verbal communication • sourcing of parts • estimating costs • documentation
Legislative requirements	Legislative requirements may include: • state/territory WHS legislation, manufacturer/component supplier specifications and safe operating procedures • environmental requirements, manual handling procedures and insurance requirements
Information/documents	Information/documents may include: • manufacturer/component supplier specifications • enterprise operating procedures • customer requirements • industry/workplace codes of practice

Unit Sector(s)

Unit sector	Common

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Co-requisite units

Not applicable.

Competency field

Competency field	Technical

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AURETB3001 Repair electric braking systems

Modification History

Release	Comment
Release 1	Replaces AURE311666A Repair electric braking systems Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit covers the competence required to repair electric braking systems and associated components as fitted to vans and trailers. This unit of competency also applies to electric braking controllers fitted to vehicles and plant and equipment. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	The unit includes identification and confirmation of work requirement, preparation for work, testing of systems and identification of faults/causes, the repair and retesting of systems and associated electric braking system components and completion of work finalisation processes, including clean-up and documentation. Work requires individuals to demonstrate some judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1. Work instructions are used to determine job requirements, including method, processes and equipment 1.2. Job specifications are read and interpreted 1.3. WHS requirements, including personal safety needs, are observed throughout the work 1.4. Equipment and tooling are identified and checked for safe and effective operation 1.5. Procedures are determined to minimise task time
2. Test systems/ components and identify faults	2.1. Correct information is accessed and interpreted from manufacturer/component supplier specifications 2.2. Tests are carried out to determine faults using tooling and techniques 2.3. Tests are completed without causing damage to any component or system 2.4. Faults are identified and preferred repair action determined 2.5. Tests are carried out according to industry regulations/ guidelines, WHS legislation, statutory legislation and enterprise procedures/policies

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ELEMENT	PERFORMANCE CRITERIA
3. Repair electric braking systems and/or associated components	3.1. Correct information is accessed and interpreted from manufacturer/component supplier specifications 3.2. Necessary repairs, component replacement and adjustments are carried out using tooling, techniques and materials 3.3. Electric braking system and/or associated component repair is completed without causing damage to any component or system 3.4. Retests are carried out to ensure correct and safe electric braking system service operation 3.5. Repairs/removal, replacement and adjustments are carried out according to industry regulations/guidelines WHS legislation, statutory legislation and enterprise/procedures policies 3.6. Workplace and equipment records are completed in accordance with workplace requirements
4. Clean up work area and maintain equipment	4.1. Material that can be reused is collected and stored 4.2. Waste and scrap is removed following workplace procedures 4.3. Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures 4.4. Unserviceable equipment is tagged and faults identified in accordance with workplace requirements 4.5. Maintenance is completed in accordance with manufacturer/component supplier specifications and workplace procedures 4.6. Tooling and equipment is maintained in accordance with workplace procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- collect, organise and understand information related to work orders, plans and safety procedures for testing and repairing of electric braking systems
- communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, and the

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REQUIRED SKILLS AND KNOWLEDGE
reporting of work outcomes and problems • plan and organise activities, including preparation and layout of work site and the obtaining of equipment and materials to avoid any backtracking or workflow interruptions • work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity • use mathematical ideas and techniques to correctly calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks • establish safe and effective work processes which anticipate and/or resolve problems and downtime, to systematically develop solutions to avoid or minimise reworking and avoid wastage • use workplace technology related to the repair of electrical braking systems, including the use of specialist tooling and measuring equipment, computerised technology, communication devices and the reporting/recording of results
Required knowledge
A working knowledge of: • WHS regulations/requirements, equipment, material and personal safety requirements • operating principles of electric braking systems • construction and operation of electric braking systems/components relevant to application • types and layout of service/repair manuals (hard copy and electronic) • pre-repair testing and fault identification procedures • repair, removal, replacement and adjustment procedures • post-repair testing procedures • work organisation and planning processes • enterprise quality processes

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • observing safety procedures and requirements

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EVIDENCE GUIDE	
	• communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • testing a range of electric braking systems • identifying faults and determining repair requirements • repairing a range of electric braking systems to workplace and manufacturer/component supplier requirements • retesting electric braking systems prior to returning to service • completing workplace/equipment documentation.
Context of, and specific resources for assessment	Application of competence is to be assessed in the workplace or simulated automotive site. Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints. Assessment is to comply with regulatory requirements, including Australian Standards. The following resources should be made available: • workplace location or simulated workplace • materials relevant to the repair of electric braking systems • equipment, hand and power tooling appropriate to the repair of electric braking systems • activities covering the mandatory task requirements • specifications and work instructions.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of AUR12 Automotive Industry RS&R Training Package • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge • Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and must reinforce the integration of key competencies • Assessment may be applied under project related conditions and require evidence of process • Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances • It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by

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EVIDENCE GUIDE	
	customers, team leaders/members or other persons subject to agreed authentication arrangements • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Electric braking systems	Electric braking systems may be in light vehicles and plant and equipment fitted with electric van/trailer braking controllers or trailers fitted with electric brakes
Repair methods	Repair methods are to include: • visual, aural and functional assessment (including damage and corrosion) • testing under operating conditions • electrical/electronic testing • removal, dismantling, reassembly and refitting • repair and/or replacement of system components • road testing/retesting prior to placing back into service
WHS requirements	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: • protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulations/codes of practice and workplace policies and procedures
Safe operating procedures	Safe operating procedures may include, but are not limited to:

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RANGE STATEMENT	
	• the conduct of operational risk assessment and treatments associated with vehicular movement, toxic substances, electrical safety, machinery movement and operation, manual and mechanical lifting and shifting, working in proximity to others and site visitors
Emergency procedures	Emergency procedures related to this unit are to include, but may not be limited to: • emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation
Environmental requirements	Environmental requirements are to include, but are not limited to: • waste management, noise, dust and clean-up management
Quality requirements	Quality requirements are to include, but are not limited to: • regulations, including Australian Standards, company quality policy and standards and enterprise operations and procedures
Statutory/regulatory authorities	Statutory/regulatory authorities may include Federal, State and local authorities administering the applicable acts, regulations and codes of practice
Tooling and equipment	Tooling and equipment may include: • hand tooling, vehicle lifting equipment and testing equipment, including multimeters, power tooling, air tooling, specialist tooling for removal/adjustment and brake decelerometer
Materials	Materials may include: • spare parts, lubricants, fluids and cleaning materials
Communications	Communications are to include, but are not limited to: • verbal and visual instructions and fault reporting and may include site specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches • safe work procedures related to the repair of electric braking systems • regulatory/legislative requirements pertaining to automotive industry, including Australian Design Rules • engineer's design specifications and instructions • organisation work specifications and requirements

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RANGE STATEMENT	
	• instructions issued by authorised enterprise or external personnel • Australian Standards

Unit Sector(s)

Unit sector	Electrical

Co-requisite units

Not applicable.

Competency field

Competency field	Technical - Brakes

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AURC341903A Apply relevant finance, leasing and insurance contracts/policies

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers the competence required to determine the finance/leasing and insurance requirements of customers and complete documentation, taking into account legal requirements.

Application of the Unit

Application of the unit	This unit of competency applies to the following and should be contextualised to the qualification to which it is being applied: • retail, service and repair administration/sales vehicle sales - finance.

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify finance/leasing options and documentation	1.1. Finance/leasing option is identified to meet specific needs of customer, including affordability and payment structure 1.2. A finance/leasing provider is identified
2. Apply finance/leasing documentation	2.1. Contracts and finance/leasing documents are completed and agreed/signed by customer 2.2. Legal requirements are identified and observed
3. Identify insurance policies and documentation	3.1. Type of insurance policy for customer is identified taking into account customer's requirements and insurance document and vehicle type and age 3.2. Insurance provider is chosen according to policy price, customer requirements and enterprise policies and procedures
4. Apply insurance documentation	4.1. Insurance contract/policy documentation is completed and agreed/signed by customer 4.2. Legal requirements are identified and observed

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
• collect, organise and understand information related to information from different insurance providers is collated • communicate ideas and information presented to the customer • plan and organise activities to obtain information for customers • work with others and in a team by consulting experienced/ specialised staff • use mathematical ideas and techniques to ensure variations in cover and cost are presented to the customer • establish diagnostic processes for recommendations made on information supplied by the customer • use workplace technology related to business technology to document insurance and finance information
Required knowledge
Knowledge of: • industry documents and how to maintain them • various types of finance/lease agreements • written communication • oral communication skills • various types of insurance policies • legal requirements

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the

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EVIDENCE GUIDE	
	critical aspects of: • correctly identifies and satisfies customer finance/ leasing and insurance requirements and completing documentation • interpreting and conveying workplace information • maintenance of workplace documents.

Context of and specific resources for assessment	• The underpinning knowledge and skills may be assessed on or off the job.
	• The assessment of practical skills must take place only after a period of supervised practice and repetitive experience. If workplace conditions are not available assessment, in simulated workplace conditions is acceptable.
	• The prescribed outcome must be achieved without direct supervision.
	• The following should be made available:
	  • a workplace or simulated workplace
	  • finance and leasing agreements
	  • insurance policies
	  • documents and stationery
	  • computer, calculator and general office equipment
	  • a qualified workplace assessor.

Method of assessment	Practical assessments: • maintain industry documents • convey information both orally and in writing • access, interpret and apply finance/lease agreements • access, interpret and apply insurance policies • complete finance/leasing and insurance documentation.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different

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RANGE STATEMENT	
work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Methods	Methods include: • determining customer leasing/finance and/or insurance requirements and undertaking documentation procedures • written, oral, fax or email
Information/documents	Information/documents may include: • enterprise operating procedures • product manufacturer/component supplier specifications • customer requirements • industry/workplace codes of practice
Occupational health and safety (OHS) practices	OHS practices must abode by: • state/territory OHS legislation • award provisions

Unit Sector(s)

Unit sector	Common

Co-requisite units

Co-requisite units		

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Competency field

Competency field	

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AURETR2010 Fabricate, test and repair wiring harnesses and looms

Modification History

Release	Comment
Release 1	ReplacesAURE220140A Manufacture and repair wiring harness/looms Performance Criteria and Range Statement updated to reflect technologies

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes required to fabricate wiring harnesses and looms, check their continuity to specification or drawing, test for functionality, and decide preferred repair action. It also includes the removal, replacement and labelling of wiring harness and loom assemblies that are an integral part of a vehicle's electrical system. The unit also involves identifying and confirming work requirements, preparing for work, and completing work finalisation processes, including clean-up and documentation. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	Work applies to wiring harnesses and looms fitted in light and heavy vehicle, mining, construction, agricultural, motorcycle, outdoor power equipment and marine environments. Work requires individuals to demonstrate some judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1. ***Workplace instructions*** are used to determine ***job requirements*** 1.2. ***Workplace health and safety (WHS) requirements*** are observed throughout the work 1.3. ***Procedures and information*** are sourced and interpreted 1.4. ***Tools and equipment*** are identified for effective fabrication, testing and repair methods
2. Check and test wiring harness and loom assembly	2.1. ***Wiring harness and looms*** are visually checked to establish the extent of damage 2.2. ***Options for diagnosing faults*** are used, using appropriate tools and diagnostic techniques 2.3. Components or systems are checked without causing damage to components or systems as a result of ***inappropriate testing procedures*** 2.4. ***Faults*** are identified and preferred repair action is determined

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3. Remove, replace and label wiring harness and loom	3.1. Correct information is accessed and interpreted from manufacturer and component supplier specifications 3.2. Wiring harness and loom are labelled and removed using tools and techniques 3.3. Associated components are labelled, removed and tagged for storage 3.4. Repaired and fabricated harness and loom are correctly refitted to vehicle and reconnected according to manufacturer and component supplier specifications 3.5. Removal, replacement and labelling are completed according to industry regulations and guidelines, and WHS and workplace policies and procedures, and without causing damage to components or systems
4. Repair wiring harness and loom	4.1. Correct information is accessed and interpreted from manufacturer and component supplier specifications 4.2. ***Repair options*** are carried out using tools, diagnostic techniques and materials 4.3. Repairs are carried out according to industry regulations and guidelines, and WHS and workplace policies and procedures
5. Fabricate wiring harness and loom	5.1. Electrical circuit wiring diagrams are accessed and interpreted from manufacturer and component supplier specifications 5.2. Harness and loom are fabricated to approved specifications using tools and contemporary fabrication techniques and materials 5.3. ***Post-repair testing*** of the harness and loom is conducted and results are documented according to workplace policies and procedures
6. Clean up work area and maintain equipment	6.1. Workplace documents are completed according to site requirements 6.2. Material that can be reused is collected and stored 6.3. Waste and scrap are removed following workplace procedures 6.4. Tools, equipment and work area are cleaned, inspected for serviceable condition, and maintained according to workplace procedures 6.5. Faulty equipment is identified, tagged and isolated according to workplace procedures 6.6. Operator maintenance is completed according to manufacturer and component supplier specifications and site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to:
  - follow verbal and written instructions
  - clarify workplace instructions and determine job requirements
  - gain information from appropriate persons and assistance as required
- learning skills to identify sources of information, assistance and expert knowledge to expand skills, knowledge and understanding
- literacy skills to:
  - read and follow information in written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
  - document required repairs and parts
- numeracy skills to:
  - test, measure and analyse test equipment results compared to desired system performance
  - assess tolerances and apply accurate measurements and adjustments
- planning and organising skills to:
  - plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed on time
  - identify risk factors and take action to minimise them
- problem-solving skills to:
  - recognise a workplace problem or potential problem and take action
  - refer problems outside area of responsibility to appropriate person and suggest possible causes
  - seek information and assistance as required to solve problems
- self-management skills to:
  - select and use appropriate equipment, materials, processes and procedures
  - recognise limitations and seek timely advice
  - follow workplace documentation, such as codes of practice and operating procedures
- teamwork skills to apply knowledge of own role to complete activities efficiently to support team activities and tasks
- technical skills to use workplace technology and tools relating to repairing vehicle wiring systems, including:
  - specialist tools and equipment
  - electrical measuring equipment
- technology skills to:
  - operate a range of electrical diagnostic test equipment
  - use technology to collect, analyse and provide information

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge

• WHS regulations, requirements, equipment, material and personal safety requirements, including:
  • codes of practice
  • personal protection needs
• wiring harness and loom fabrication techniques
• procedures for removing and replacing wiring harness and looms
• soldering procedures and techniques
• cable types and sizes and current carrying capacity
• various types of wiring systems found in vehicles, including:
  • basic wiring
  • twisted pair
  • shielded wiring
  • databus networks
• techniques for reading and interpreting technical information, wiring diagrams and graphic symbols
• diagnostic and testing procedures, including:
  • testing procedures for wiring harnesses and looms, including resistance and voltage drop and circuit performance checks
  • analysis of system operation using basic electrical test equipment and other industry-relevant test equipment
  • visual, aural and functional assessments, including:
  • component damage and wear
  • component corrosion
  • water and moisture ingress
• repair procedures, including:
  • component removal and replacement procedures
  • component and associated system adjustment procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to workplace operations and satisfy all of the requirements of the performance criteria and required skills and knowledge. A person who demonstrates competency in this unit must be able to: • observe safety procedures and requirements • select methods and techniques appropriate to the circumstances • complete preparatory activity in a systematic manner • select and use appropriate materials for fabricating, testing and repairing wiring harnesses and looms • test wiring of harnesses and looms and locate potential faults • remove and replace wiring harnesses and looms • test and repair wiring harnesses and looms to manufacturer specification • perform electrical connections, including crimping and soldering to manufacturer specification • perform a terminal retention check following replacement of terminals in a wiring connector • fabricate wiring harnesses.
Context of, and specific resources for assessment	Competency is to be assessed in the workplace or a simulated workplace environment that accurately reflects performance in a real workplace setting. Assessment is to occur: • using standard workplace practices and procedures • following safety requirements • applying environmental constraints. Assessment is to comply with relevant: • regulatory requirements • Australian standards • industry codes of practice. The following resources must be made available for the assessment of this unit: • workplace location or simulated workplace • material relevant to the fabrication and repair of wiring harnesses and looms • equipment, and hand and power tools appropriate to fabricating, testing and repairing wiring harnesses and looms • specifications and work instructions.

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EVIDENCE GUIDE	
Method of assessment	Assessment must satisfy the endorsed Assessment Guidelines of this Training Package. Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with the application of required skills and knowledge. Assessment methods must be by direct observation of tasks and include questioning on required skills and knowledge to ensure correct interpretation and application. Competence in this unit may be assessed in conjunction with other units which together form part of a holistic work role. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate the needs of diverse clients. Assessment processes and techniques must be culturally sensitive and appropriate to the language, literacy and numeracy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Workplace instructions may include:	• electronic or hard copy instructions • verbal instructions • written instructions.
Job requirements may include:	• diagnosis and repair methods, processes and equipment.

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RANGE STATEMENT	
Workplace health and safety requirements may include:	• personal protective clothing and equipment • hazards associated with high voltage ignition systems • safe use of tools and equipment • safe handling of material • use of fire-fighting equipment • workplace safety policies and procedures • workplace first aid equipment • hazard control, including control of hazardous materials and toxic substances.
Procedures and information may include:	• verbal, written and graphical instructions • signage • work schedules, plans and specifications • work bulletins and memos • material safety data sheets • diagrams and sketches • regulatory and legislative requirements relating to automotive industry • Australian Design Rules • engineer's design specifications and instructions • workplace work specifications and requirements • instructions issued by authorised workplace or external persons • Australian standards • vehicle service requirements and repair manuals.
Tools and equipment may include:	• hand tools • testing equipment, including multimeters and ohmmeters • insulation testers • crimping tools • soldering iron • heat-gun or blower • wire and cabling of various colours and sizes • heat shrink sleeving and flexible conduit • terminals and connectors • electrical tape.

Wiring harness and looms may include:	• basic single wiring, for example:
	  • tailer harness
	  • driving lights harness
	• complex multi-wiring with varying wire gauges
	• CAN-bus network wiring, including:
	  • twisted pair
	  • shielded wiring.

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RANGE STATEMENT	
Options for diagnosing faults may include:	• continuity testing • insulation testing • isolation of faults • visual inspection and evaluation of components.

Inappropriate testing procedures may include:	• intrusive testing (which must not be performed as it is not a recommended test and repair method), which includes:
	  • back probing terminals and connectors and fuse holders with inappropriate test probes
	  • probing terminal and connectors with inappropriate test probes
	  • pushing sharp probes and objects into wiring insulation.

Faults may include:	• open circuits • short circuits • damaged insulation • frayed wires • burnt wiring • water and moisture ingress • connector damage • terminal damage • diagnosis trouble codes (DTC) being set.

Repair options may include:	• pre- and post-repair testing
	• identifying and testing components
	• diagnosing and determining faults
	• component repair procedures, including:
	  • removal, replacement and adjustment procedures
	  • dismantle, repair, reassembly and adjustment procedures
	• electrical measurements
	• peak voltage testing
	• visual and functional assessments, including for damage and wear.

Post-repair testing may include:	• validating effectiveness of the repair action • confirming that reported fault has been rectified • confirming that no other faults are present as a result of the repair action.

Unit Sector(s)

Competency field	Electrical

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Unit sector	Technical – Electrical and Electronic

Custom Content Section

Not applicable.

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AURETR2012 Test and repair basic electrical circuits

Modification History

Release	Comment
Release 1	Replaces AURE218708A Carry out repairs to single electrical circuits Performance Criteria and Range Statement updated to reflect technologies

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes required to test and carry out repairs to basic electrical circuits in an automotive retail, service or repair environment. The unit also involves identifying and confirming work requirements, preparing for work, identifying faults and potential causes, repairing and replacing basic circuit components, and completing work finalisation processes, including clean-up and documentation. It includes replacing fuses, circuit breakers, lamps, switches, terminals and connectors; and basic wiring repairs. It includes the following fault types: open circuits, short circuits and high resistance circuits to power, signal and ground paths. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	Work applies to testing and repairing basic electrical circuits in light and heavy vehicle, mining, construction, agricultural, motorcycle, outdoor power equipment and marine environments. It applies to circuits in an automotive retail, service or repair environment. Work requires individuals to demonstrate judgement and problem-solving skills in managing own work activities and contributing to a productive team environment within the scope of this unit.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1. ***Workplace instructions*** are used to determine ***job requirements*** 1.2. ***Workplace health and safety (WHS) requirements*** are observed throughout the work 1.3. ***Procedures and information*** are sourced and interpreted 1.4. ***Tools and equipment*** are identified for effective testing and repair procedures
2. Test basic electrical circuits and identify faults	2.1. ***Basic electrical circuits*** are visually checked to establish the extent of failure or damage, applying knowledge of electrical fundamentals 2.2. ***Options for diagnosing faults*** are identified and used, using appropriate tools and diagnostic techniques 2.3. Inspection and testing are undertaken without causing

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	damage to components or systems as a result of ***inappropriate testing procedures*** 2.4. ***Faults*** are identified from test results and causes of faults are determined 2.5. Diagnosis findings are reported according to workplace procedures, including recommendations for necessary repairs or adjustments
3. Complete repairs to basic electrical circuits	3.1. ***Repair options*** are analysed and those most appropriate are selected 3.2. Appropriate tools, repair techniques and materials are selected and prepared 3.3. Repairs and component replacements and adjustments are carried out without causing damage, according to workplace procedures and manufacturer and component supplier specifications 3.4. ***Post-repair testing*** is conducted and results are documented according to workplace procedures
4. Prepare vehicle and equipment for delivery to customer after repair is completed	4.1. Final inspection is made to ensure work is to workplace expectations 4.2. Vehicle is cleaned to workplace expectations and presented ready for use 4.3. Workplace documentation is processed according to workplace procedures
5. Clean up work area and maintain equipment	5.1. Material that can be reused is collected and stored 5.2. Waste and scrap are removed following workplace procedures 5.3. Equipment and work area are cleaned and inspected for serviceable condition according to workplace procedures 5.4. Faulty equipment is identified, tagged and isolated according to workplace procedures 5.5. Operator maintenance is completed according to manufacturer and component supplier specifications and site procedures 5.6. Tools and equipment are maintained according to workplace procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE

Required skills

- communication skills to:
  - follow verbal and written instructions
  - clarify workplace instructions and determine job requirements
  - gain information from appropriate persons and assistance as required
- initiative and enterprise skills to apply learning when testing and repairing basic electrical circuits
- learning skills to identify sources of information, assistance and expert knowledge to expand skills, knowledge and understanding
- literacy skills to:
  - read and follow information in written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
  - obtain and record measurements
  - document work performed
- numeracy skills to:
  - test, measure and analyse test equipment results compared to desired system performance
- planning and organising skills to ensure tasks are completed within an acceptable time frame
- problem-solving skills to seek information and assistance as required to solve problems
- self-management skills to:
  - select and use appropriate equipment, materials, processes and procedures
  - follow workplace documentation, such as codes of practice and operating procedures
- technical skills to use workplace technology and tools to test and repair basic electrical circuits and components in vehicles, including:
  - specialist tools and equipment
  - electrical measuring equipment
- technology skills to:
  - operate a range of electrical diagnostic test equipment
  - use technology to collect, analyse and provide information

Required knowledge

- WHS regulations, requirements, equipment and material relating to testing and repairing electrical circuits, including personal safety requirements
- electrical principles, including:
  - current, voltage, resistance and power
  - series circuits
  - parallel circuits
  - series and parallel circuits
  - Ohm’s law
- basic electrical circuit components, including:

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REQUIRED SKILLS AND KNOWLEDGE
• cable types and sizes and current carrying capacity • circuit protection devices • switches • relays • automotive globes • techniques for reading and interpreting technical information, including circuit types, diagrams and symbols • types and operation of electrical testing equipment, including: • digital multimeters • test lights and probes • electrical measuring and testing procedures, including: • resistance and voltage drop tests • open and short circuit tests • inspecting for component moisture ingress and connector damage • repair procedures of electrical circuits, including: • wire soldering procedures • terminal crimping • removal and replacement procedures for basic electrical components

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to workplace operations and satisfy all of the requirements of the performance criteria and required skills and knowledge. A person who demonstrates competency in this unit must be able to: • observe safety procedures and requirements • select methods and techniques appropriate to the circumstances • complete preparatory activity in a systematic manner • read and interpret circuit wiring diagrams

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EVIDENCE GUIDE	
	• test basic electrical circuits to determine short, open and high resistance between power, signal and ground paths • demonstrate understanding of the principle of current flow in a simple circuit and voltage drop across a resistive load • test and repair basic wiring harnesses and looms to manufacturer specifications • perform electrical connections, including crimping and soldering to manufacturer specification • perform a terminal retention check following replacement of terminals in a wiring connector • accurately interpret test results • present vehicle and equipment in a condition that complies with workplace requirements.
Context of, and specific resources for assessment	Competency is to be assessed in the workplace or a simulated workplace environment that accurately reflects performance in a real workplace setting. Assessment is to occur: • using standard workplace practices and procedures • following safety requirements • applying environmental constraints. Assessment is to comply with relevant: • regulatory requirements • Australian standards • industry codes of practice. The following resources must be made available for the assessment of this unit: • workplace location or simulated workplace • material relevant to testing and repairing basic electrical circuits and components • equipment, and hand and power tools appropriate to testing and repairing basic electrical circuits and components • specifications and work instructions.
Method of assessment	Assessment must satisfy the endorsed Assessment Guidelines of this Training Package. Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with the application of required skills and knowledge. Assessment methods must be by direct observation of tasks and include questioning on required skills and knowledge to ensure

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EVIDENCE GUIDE	
	correct interpretation and application. Competence in this unit may be assessed in conjunction with other units which together form part of a holistic work role. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate the needs of diverse clients. Assessment processes and techniques must be culturally sensitive and appropriate to the language, literacy and numeracy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Workplace instructions may include:	• electronic or hard copy instructions • verbal instructions • written instructions.
Job requirements may include:	• testing and repair methods, processes and equipment.
Workplace health and safety requirements may include:	• personal protective clothing and equipment • hazards associated with high voltage ignition systems • safe use of tools and equipment • safe handling of material • use of fire-fighting equipment • workplace safety policies and procedures • workplace first aid equipment • hazard control, including control of hazardous materials and toxic substances • identifying hazards associated with soldering processes • identifying hazards associated with working with vehicle supplementary restraint systems (SRS).

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RANGE STATEMENT	
Procedures and information may include:	• verbal, written and graphical instructions • signage • work schedules, plans and specifications • work bulletins and memos • material safety data sheets • diagrams and sketches • regulatory and legislative requirements relating to automotive industry • Australian Design Rules • engineer's design specifications and instructions • workplace work specifications and requirements • instructions issued by authorised workplace or external persons • Australian standards • vehicle service requirements and repair manuals.
Tools and equipment may include:	• hand tools • digital multimeters • test lights and probes • insulation testers • crimping tools • soldering iron • heat-gun or blower • wire and cabling of various colours and sizes • heat shrink sleeving and flexible conduit • terminals and connectors • electrical tape.
Basic electrical circuits may include:	• basic single wire circuits (non CAN-bus networked circuits) • door ajar switch interior courtesy light • battery B+ to fuse panel • accessory B+ to lighter or accessory socket • heated rear demister • interior lighting • exterior lighting • rear brake lighting • wiper and washer • electric engine cooling fan.
Options for diagnosing faults may include:	• verification of fault • continuity testing • insulation testing • isolation of faults • replacement of blown fuses

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RANGE STATEMENT	
	• replacement of blown globes and lamps • replacement of damaged terminals and connectors • visual inspection and evaluation of components.

Inappropriate testing procedures may include:	• intrusive testing (which must not be performed as it is not a recommended test and repair method), which includes:
	  • back probing terminals and connectors and fuse holders with inappropriate test probes
	  • probing terminal and connectors with inappropriate test probes
	  • pushing sharp probes and objects into wiring insulation.

Faults may include:	• open circuits • high resistance circuits • short circuits • damaged insulation • frayed wires • burnt wiring • water and moisture ingress • connector damage • terminal damage • diagnosis trouble codes (DTC) being set.

Repair options may include:	• pre- and post-repair testing
	• identifying and testing components
	• diagnosing and determining faults
	• component repair procedures, including:
	  • removal, replacement and adjustment procedures
	  • dismantle, repair, reassembly and adjustment procedures
	• electrical measurements
	• visual and functional assessments, including for damage and wear.

Post-repair testing may include:	• validating the effectiveness of the repair action • confirming that reported fault has been rectified • confirming that no other faults are present as a result of the repair action.

Unit Sector(s)

Competency field	Electrical

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Unit sector	Technical – Electrical and Electronic

Custom Content Section

Not applicable.

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AURETR2015 Inspect and service batteries

Modification History

Release	Comment
Release 1	Replaces AURE218670A Service, maintain or replace batteries Performance Criteria and Range Statement updated to reflect technologies

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes required to inspect and service batteries. The unit involves identifying and confirming work requirements, preparing for work, testing batteries, analysing test results, servicing and maintaining batteries, and completing work finalisation processes, including clean-up and documentation. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Application of the Unit

Application of the unit	Work applies to light and heavy vehicle, mining, construction, agricultural, motorcycle, outdoor power equipment and marine environments. Work requires individuals to demonstrate some judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare to inspect battery	1.1. Nature and scope of work requirements are identified and confirmed 1.2. ***Workplace health and safety (WHS) requirements***, including state and territory regulatory requirements, and ***personal protective equipment (PPE)*** needs, are observed throughout the work 1.3. ***Safe operating procedures*** and information are sourced 1.4. Technical requirements necessary for inspection are sourced, and tools, ***equipment*** and ***materials*** are identified and prepared
2. Test battery	2.1. Test methods are implemented according to workplace procedures and manufacturer and component supplier specifications 2.2. Test results are compared with manufacturer and component supplier specifications 2.3. Results are documented with evidence, and supporting information is recorded 2.4. Test results and findings are communicated to the appropriate workshop personnel for replacement or repair action

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ELEMENT	PERFORMANCE CRITERIA
3. Carry out service and maintenance to battery	3.1. ***Service and maintenance methods*** are carried out according to workplace procedures and manufacturer and component supplier specifications 3.2. Electrolyte levels are checked and topped up where appropriate according to service and maintenance methods 3.3. Battery terminals and connection to vehicle wiring are inspected 3.4. Condition is reported to persons responsible for repair action 3.5. Batteries and terminals are cleaned according to service and maintenance methods
4. Prepare vehicle and equipment for delivery to customer after service is completed	4.1. Final inspection is made to ensure work is to workplace expectations 4.2. Vehicle is cleaned to workplace expectations and presented ready for use 4.3. Workplace documentation is processed according to workplace procedures
5. Clean up work area and maintain equipment	5.1. Work schedule and job card documentation are completed 5.2. Equipment and work area are cleaned and inspected for serviceable condition according to workplace procedures 5.3. Faulty equipment is identified, tagged and isolated according to workplace procedures 5.4. Tools and equipment are maintained according to workplace procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to:
  - follow verbal and written instructions
  - communicate basic information relating to battery safety
  - clarify workplace instructions and determine job requirements
  - gain information from appropriate persons and assistance as required
- initiative and enterprise skills to:
  - participate in self-improvement activities

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REQUIRED SKILLS AND KNOWLEDGE

- recognise a workplace problem or potential problem
- literacy skills to:
  - read and interpret technical information relating to recognising and reporting unsafe situations
  - read, understand and follow battery inspection and maintenance information
  - read, understand and follow information on standard operating procedures and repair guidelines
- numeracy skills to:
  - test, measure and analyse test equipment results compared to desired battery performance
- planning and organising skills to:
  - identify risk factors to minimise risk to self and others
  - contribute to activities that implement standard workplace procedures
- problem-solving skills to refer problems outside area of responsibility to appropriate person
- self-management skills to:
  - locate and identify appropriate tools and equipment
  - locate technical information
  - recognise limitations and seek timely advice
- teamwork skills to:
  - work with others and in a team by cooperating with team members
  - work with diverse individuals and groups
- technical skills to:
  - select tools and equipment appropriate to inspecting, servicing and maintaining batteries in light and heavy vehicles, mobile plant and mining vehicles
  - use battery servicing and testing tools and equipment safely
  - maintain tools and equipment using appropriate techniques and standard operating procedures
- technology skills to use workplace technology to:
  - assist with work practices
  - inspect, service and maintain battery storage systems, including use of specialist tools, measuring equipment and communication devices
  - report and document inspection and servicing results

Required knowledge

- WHS and environmental regulations, requirements, equipment, material and personal safety requirements to ensure batteries are maintained, handled and disposed of in an environmentally sustainable manner
- battery service and maintenance procedures
- battery testing methods
- dangers of working with battery testing equipment
- operating principles and layout of vehicle battery storage systems

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REQUIRED SKILLS AND KNOWLEDGE
• original equipment manufacturer (OEM) specific procedures for inspecting maintenance-free batteries • workplace quality procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to workplace operations and satisfy all of the requirements of the performance criteria and required skills and knowledge. A person who demonstrates competency in this unit must be able to: • observe safety procedures and requirements • select methods and techniques appropriate to the circumstances • complete preparatory activity in a systematic manner • inspect, service and maintain battery storage systems in light and heavy vehicle, mining, construction, agricultural, motorcycle, outdoor power equipment and marine environments according to manufacturer and component supplier and site requirements • inspect, service and maintain at least three different types of batteries according to manufacturer and site requirements • complete workplace documents.
Context of, and specific resources for assessment	Competency is to be assessed in the workplace or a simulated workplace environment that accurately reflects performance in a real workplace setting. Assessment is to occur: • using standard workplace practices and procedures • following safety requirements • applying environmental constraints. Assessment is to comply with relevant:

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EVIDENCE GUIDE	
	• regulatory requirements • Australian standards • industry codes of practice. The following resources must be made available for the assessment of this unit: • workplace location or simulated workplace that best reflects a light or heavy vehicle service facility or environment • material relevant to inspecting, servicing and maintaining battery storage systems • equipment, and hand and power tools appropriate to servicing and maintaining batteries • specifications and work instructions.
Method of assessment	Assessment must satisfy the endorsed Assessment Guidelines of this Training Package. Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with the application of required skills and knowledge. Assessment methods must be by direct observation of tasks and include questioning on required skills and knowledge to ensure correct interpretation and application. Competence in this unit may be assessed in conjunction with other units which together form part of a holistic work role. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate the needs of diverse clients. Assessment processes and techniques must be culturally sensitive and appropriate to the language, literacy and numeracy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Workplace health and safety requirements may include:	• personal protective clothing and equipment • safe use of tools and equipment • safe handling of potentially hazardous material and substances • use of fire-fighting equipment • first aid training and response • control of hazards and hazardous materials.
Personal protective equipment may include:	• safety glasses • protective clothing • gloves.
Safe operating procedures may include:	• conducting operational risk assessment • treatments associated with vehicle movement • toxic substances • electrical safety • machinery movement and operation • manual and mechanical lifting and shifting • procedures for working in proximity to others and site visitors.
Tools and equipment may include:	• hand tools • load testing devices • hydrometer • multimeter.
Materials may include:	• battery consumables • cleaning materials.
Service and maintenance methods may include:	• inspecting battery and leads • inspecting battery securing system • cleaning battery and battery compartments • topping battery fluid • testing battery with a hydrometer.

Unit Sector(s)

Competency field	Electrical
Unit sector	Technical – Electrical and Electronic

Custom Content Section

Not applicable.

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AURSAA2001 Process customer complaints

Modification History

Release	Comment
Release 1	Replaces AURS252290A Process customer complaints Unit code updated to meet policy requirements Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence to deal with customer complaints in a manner satisfying the customer but complies with enterprise policies and procedures. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	Every action or output has a customer and therefore customers may be internal work colleagues or external to the enterprise.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Clarify the nature of complaint	1.1. Details of the complaint are established 1.2. Summary of the complaint is documented accurately 1.3. Any inconvenience to the customer is acknowledged and an apology is made
2. Identify options for complaint resolution	2.1. Options for resolving the complaint are identified 2.2. Complaint is referred to designated officer if resolution is not possible
3. Act to resolve complaint	3.1. Optimal solution is negotiated with customer 3.2. Chosen solution is implemented within agreed timeframe 3.3. Necessary documentation is finalised 3.4. Effectiveness of solution and related outcomes is evaluated 3.5. Any necessary changes to enterprise procedures are identified and passed on to appropriate persons for action

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- collect, organise and understand information related to:
- technical literacy and interpretive skills to interpret and discern facts related to the customer complaint
- basic research and analytical skills to investigate and identify factors which caused/contributed to the complaint
- communicate ideas and information
- plain English literacy and communication skills in relation to dealing with customers and their complaints
- questioning and active listening skills, for example when obtaining factual information from excitable customers
- plan and organise activities to plan an approach to identify and resolve a complaint
- work with others and in a team by involving a designated officer if solution is not possible
- use mathematical ideas and techniques when options/solutions are costed
- establish diagnostic processes including basic conflict resolution skills for handling difficult or abusive customers, and greeting/farewelling techniques
- use workplace technology related to use of business technology to make changes to enterprise procedures

Required knowledge

- general knowledge of range of enterprise merchandise and services, location of departments/sections and telephone extensions of departments/sections
- general operational knowledge of industry/workplace codes of practice in relation to customer service
- basic working knowledge of legislation and statutory requirements, including consumer law, trade practices and fair trading legislation
- working knowledge of enterprise policies and procedures in regard to:
  - customer service
  - dealing with difficult customers
  - allocated duties/responsibilities
- working knowledge of enterprise complaints handling procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence in this unit signifies ability to transfer competence to changing circumstances and to respond to unusual circumstances in the critical aspects of: • accurately clarifying the nature and extent of complaint • identifying options for complaint resolution • resolving complaint to customer satisfaction • contributing to avoidance of further complaints • communicating effectively with others involved in or affected by the work.

Context of, and specific resources for assessment	• Elements of competence contain both knowledge and practical components. Knowledge components may be assessed off the job. Practical components should be assessed on the job or in a simulated work environment covering a range of customer types
	• The following are required:
	  • a workplace or simulated workplace
	  • enterprise or equivalent policy and procedures relating to customer service and complaint handling processes
	  • enterprise or equivalent instructions related to legal implications of customer relations and complaints
	  • a range of customers with complaints (real or simulated)
	  • a qualified workplace assessor.

Method of assessment	• This unit may be assessed in conjunction with other units forming part of the job role or function • It is preferable assessment reflects a process rather than an event and occurs over a period of time to cover varying circumstances. Evidence of performance may be provided by customers, team leaders/members or other appropriate persons subject to agreed authentication arrangements • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.
Guidance information for	

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EVIDENCE GUIDE	
assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Complaints	Complaints may include: • matters related to personal interaction with customers, incorrect products, faulty products, charging/costing policy, delivery system failures, installation deficiencies and service delays
Customers	Customers may be regular or new and may have routine or special requests. They may include persons from a range of social, cultural or ethnic backgrounds and physical and intellectual abilities. Regardless, customers are made feel welcome, valued and, at end of the process, satisfied. Customer contact may be face to face, by telephone, by electronic means or in writing
Customer service	Customer service may include: • enterprise activities, internal and external customers and follow-up in event of delays in service provision
Customer needs	Customer needs may include: • information regarding products or services available, quality of products or services, complementary products or services, enterprise facilities and services and location of specific items
Staff	Staff may be:

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RANGE STATEMENT	
	• full-time, part-time or casual and vary in terms of staff training, product knowledge and in staffing levels (e.g. staff shortages) • operating in routine or busy trading conditions
Enterprise	Enterprises may vary in size, type and location, in range of merchandise and services provided and in delivery policies
Communication	Communications may be: • verbal, written, by telephone, by electronic or other available means
Record keeping	Accurate records of information are completed and may be stored manually, electronically or by other means
Resources	Resources may include: • enterprise or equivalent policy and procedures relating to customer service and complaint handling processes • enterprise or equivalent instructions related to legal implications of customer relations and complaints • a range of customers with complaints (real or simulated)
Information/documents	Sources of information/documents may include: • enterprise policies and procedures relating to customer service, equipment and product manufacturer/component supplier specifications, enterprise operating procedures, industry/workplace codes of practice, customer requirements

Unit Sector(s)

Unit sector	Sales and Parts, Administration and Management

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Co-requisite units

Not applicable.

Competency field

Competency field	Administration

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AURSBA3002 Apply automotive parts interpretation process

Modification History

Release	Comment
Release 1	Replaces AURS338103A Apply automotive parts interpretation process Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence to identify uncommon or unusual automotive parts based on evidence from customers and/or other sources which may include catalogue numbers, samples and verbal, written or graphic descriptions of parts or their purpose. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	The parts or vehicle may not be in common use and therefore research and/or interpretation may be required to identify and satisfy customer requirements.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify the part and its end use	1.1. Customer is made to feel welcome and valued 1.2. Available information on required part is gathered, documented and confirmed with customer 1.3. End use or host for the part, i.e. vehicle/unit assembly or vehicle/unit assembly options, is established from an analysis of available information
2. Identify and record details of the part	2.1. The parts cataloguing system to host vehicle/unit is identified and accessed 2.2. Part is matched accurately with cataloguing information by accessing and using the catalogue system, its aids and user guides 2.3. Expert advice is sought from provider/supplier to clarify imprecise identification outcomes 2.4. Details of identity of the part are documented and processed
3. Part is supplied or ordered for customer	3.1. Customer accepts process used 3.2. Part is supplied or ordered if not in stock 3.3. Customer records are updated

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- collect, organise and understand information related to technical literacy and interpretive skills sufficient to access keywords and phrases and to interpret schematics and technical drawings
- communicate ideas and information
- questioning and active listening skills, for example when eliciting information on product and end use issues
- plain English literacy and communication skills in relation to dealing with customer and providers/suppliers
- plan and organise activities when planning a logical approach to identify part/product
- work with others and in a team by seeking assistance from team members
- use mathematical ideas and techniques to estimate quantities if part/product is to be ordered
- establish diagnostic processes including problem-solving and analytical skills for a range of unpredictable circumstances, for example, clarifying a general need and researching through parts catalogue systems to correctly identify part or technically acceptable options. This may involve recognition of pathways addressing country of origin, historic or period-based terminology/language variations
- use workplace technology related to computing skills in relation to accessing and interpretation of computer-based parts catalogue systems

Required knowledge

- general knowledge of current and historic automotive terminology
- general knowledge of main automotive systems and assemblies and their functions
- general knowledge of historic background to the parts system
- general knowledge of range of manual and computerised parts catalogue systems in common usage throughout industry
- detailed knowledge of the parts catalogue systems, both brand specific and general options, used by enterprise
- general knowledge of legal issues associated with supply and use of non-conforming parts/components/accessories
- broad knowledge of workplace health and safety (WHS) in relation to customer safety and ergonomics of computer workstations

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence in this unit signifies ability to transfer competence to changing circumstances and to respond to unusual circumstances in the critical aspects of: • eliciting sufficient information from the customer and/or other sources to enable a confirmed identification of vehicle or unit the part is intended • identifying and locating parts catalogue systems associated with required vehicle/unit • using parts catalogues and equivalent documentation, both hard copy and electronic, to trace and identify specific brand parts • using parts catalogues and equivalent documentation, both hard copy and electronic medium, to trace and identify general or optional parts/products.

Context of, and specific resources for assessment	• Assessment is to cover both manual and computer-aided/ based parts catalogue systems
	• Assessment of this unit must be completed on the job or in a simulated work environment reflecting a range of parts identification requirements in terms of available information, customer types and complexity of parts tracking.
	• Assessment must cover both specified brand and general parts and is to occur in an environment where competing demands of a number of customers are evident
	• The following are required:
	  • a workplace or simulated workplace
	  • customers and requests for parts information
	  • parts cataloguing systems (both computerised and manual)
	  • a qualified workplace assessor.

Method of assessment	• It is preferable assessment reflects a process rather than an event and occurs over a period of time to cover varying

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EVIDENCE GUIDE	
	circumstances. • Customers, team leaders/members or other appropriate persons, subject to agreed authentication arrangements, may provide evidence of performance • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role • This unit should be assessed in conjunction with other units within context of the candidate's job role or function.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Automotive parts	Automotive parts may include: • automotive parts, components and accessories specific to vehicle type or are for general use by industry. They will generally be for older, rare or specialised vehicles
Customers	Customers include both external and internal customers who may be technically qualified to describe parts, or technical novices requiring detailed support. Regardless, customers are made feel welcome, valued and, at end of the process, satisfied
Vehicle/unit identity options	An examination of a sample of required part or customer vehicle may be necessary to clarify situation

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RANGE STATEMENT	
Solution	Solution is not necessarily apparent where hybrid vehicles/units are concerned and a range of options may need to be identified and pursued
Legislative requirements	Legislative requirements include: • state/territory legislation related to WHS and Australian Design Rules
Communications	Communications with customer/user may be: • face to face, by telephone or by other electronic means
Recording of information	Recording of information provided by customer may need to be used when customer is no longer present and therefore an accurate record of information needs to be completed, retained and recovered when needed
Resources	Resources may include: • hard copies of catalogues, databases and access to internet
Parts information	Parts information may include: • manufacturer/component supplier specifications and technical documentation, enterprise procedures and documentation, enterprise or industry comparative specifications, diagrams, sketches, verbal descriptions and physical and visual evidence This may range from an accurate catalogue number or reference to a generalised description of purpose by a customer who has little technical knowledge or expertise
Information gathering techniques	• Customer may require active assistance and questioning to fully describe requirement in terms of vehicle/unit model, date of manufacture, purpose and appearance of the part and other tracking information • Customer may be seeking an inappropriate solution to a technical problem and if sufficient doubt exists, may require referral to a service provider
Parts cataloguing systems	Parts cataloguing systems may be:

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RANGE STATEMENT	
	• hard copy (book-fast, loose-leaf) micro-fiche/micro-film, stand-alone computer or networked/on-line computer-supported services Depending on age of required part, any or all of above systems may need to be accessed
Catalogue system aids and user guides	Catalogue system aids and user guides may include: • written instructions within the system, guides in the form of diagrams, flow charts and process schematics, menus and prompts and one to three dimensional system/component diagrams, models and graphics
Provider/supplier information	Provider/supplier information is not always required, but should be sought or accessed where incorrect identification of parts may result in legal liability, customer dissatisfaction and/or alienation

Unit Sector(s)

Unit sector	Sales and Parts, Administration and Management

Co-requisite units

Not applicable.

Competency field

Competency field	Support and Logistics

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AURSCA2001 Select automotive parts and products

Modification History

Release	Comment
Release 1	Replaces AURS238127A Identify and select automotive parts and products Unit code updated to meet policy requirements Minor changes to unit title Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence required to identify automotive parts and products based on evidence from customers and/or other sources which may include catalogue numbers or samples of parts/products or their purpose. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	It requires application of both manual and computer based catalogue or equivalent systems. Work requires individuals to demonstrate some judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify the part/product and its end use	1.1. Customer is made to feel welcome and valued 1.2. Available information on the required part/product is gathered, documented and confirmed with customer 1.3. End use or host for the part/product, i.e. vehicle/unit assembly or vehicle/unit assembly options, is established from an analysis of available information
2. Identify details of the part/product	2.1. The parts/product cataloguing system is identified and accessed 2.2. Part/product is matched accurately with cataloguing information by accessing and using the catalogue system 2.3. Details of identity of the part/product are documented and processed

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ELEMENT	PERFORMANCE CRITERIA
3. Part/product is supplied or ordered for customer	3.1. Customer accepts process used 3.2. Part/product is supplied or ordered if not in stock 3.3. Customer records are updated

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- apply research and interpretive skills sufficient to locate, interpret and apply manufacturer/component supplier procedures, workplace policies and procedures
- apply analytical skills required for identification and analysis of technical information
- apply plain English literacy and communication skills in relation to dealing with customer and team members
- apply questioning and active listening skills, for example when obtaining information from customers
- apply oral communication skills sufficient to convey information and concepts to customers
- apply planning and organising skills to own work activities, including making good use of time and resources, sorting out priorities and monitoring own performance
- interact effectively with other persons, including product specialists, both on a one-to-one basis and in groups, including understanding and responding to the needs of a customer and working effectively as a member of a team to achieve a shared goal
- establish safe and effective work processes which anticipate and/or resolve problems, to systematically develop solutions to avoid or minimise reworking and to avoid wasting customer time
- use mathematical ideas and techniques to correctly calculate material requirements, estimate and calculate costs and establish quality checks
- use workplace technology related to customer services, including use of measuring equipment, computerised technology, use of communication devices and reporting/ documenting of results

Required knowledge

A working knowledge of:

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REQUIRED SKILLS AND KNOWLEDGE
• workplace health and safety (WHS) in relation to customer safety and ergonomics of computer workstations • common automotive terminology • the main automotive systems and assemblies and their functions • the parts/product catalogue systems, both brand-specific and general options, used by enterprise • the legal issues associated with the supply and use of non-conforming parts/components/accessories • enterprise quality processes • work organisation and planning processes

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence in this unit signifies ability to transfer competence to changing circumstances and to respond to unusual circumstances in the critical aspects of: • eliciting sufficient information from the customer and/or other sources to enable a confirmed identification of vehicle or unit the part/product intended • accessing the parts/products catalogue systems associated with required vehicle/unit • using both manual and computer-based parts/products catalogues and equivalent documentation to trace and identify common specific brand parts/products • communicating effectively with others involved in or affected by the work.
Context of, and specific resources for assessment	• Application of competence is to be assessed in the workplace or simulated worksite. • Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints. • Assessment is to comply with regulatory requirements, including Australian standards.

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EVIDENCE GUIDE	

	• The following resources should be made available:
	  • workplace location or simulated workplace
	  • information and material identifying and selecting automotive parts and products
	  • equipment identifying and selecting automotive parts and products
	  • activities covering task requirements
	  • specifications and work instructions.

Method of assessment	• Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. • Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • It is preferable assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other appropriate persons subject to agreed authentication arrangements. • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating

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RANGE STATEMENT	
conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Automotive part/product	Automotive part/product may include: • automotive parts, components and accessories specific to vehicle type or are for use by industry, and refinishing and treatment products
Customers	Customers include both external and internal customers who may be technically qualified to describe parts/products, or technical novices requiring detailed support. Regardless, customers are made feel welcome, valued and, at end of the process, satisfied
Part/product information	Part/product information may include: • manufacturer/component supplier specifications and technical documentation, enterprise procedures and documentation, enterprise or industry specifications, diagrams, sketches, verbal descriptions and physical and visual evidence
Information gathering techniques	Customer may require active assistance and questioning to fully describe requirement in terms of common vehicle/unit model, date of manufacture, purpose and appearance of product and other tracking information
Recording of information	Information provided by customer may need to be used when customer is no longer present and therefore an accurate record of information needs to be completed, retained and recovered when needed
Parts/products cataloguing systems	Parts/products cataloguing systems may be hard-copy (book-fast, loose-leaf), stand-alone computer or networked/online computer-supported services
Provider/supplier information	Provider/supplier information is not always required, but should be sought or accessed where incorrect identification of the part/product may result in legal liability, customer dissatisfaction

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RANGE STATEMENT	
	and/or alienation
WHS requirements	WHS is to be in accordance with legislation/regulations/ codes of practice and enterprise safety policies and procedures, and may include: • protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire-fighting equipment, enterprise first-aid, hazard control and hazardous materials and substances
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulation/codes of practice and workplace policies and practices
Safe operating procedures	Safe operating procedures are to include, but are not limited to: • conduct of operational risk assessment and treatments associated with customer safety and working in proximity to others and site visitors
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to: • enterprise first aid requirements and site evacuation
Environmental requirements	Environmental requirements are to include, but are not limited to: • pollution and clean-up management
Quality requirements	Quality requirements are to include, but are not limited to: • regulations, including Australian standards, enterprise quality policy, standards, operations and procedures
Legislative requirements	Statutory/regulatory authorities may include: • federal, state/territory and local authorities administering acts, regulations and codes of practice
Communications	Communications are to include, but are not

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RANGE STATEMENT	
	limited to: • verbal and visual instructions and may include site specific instructions, telephones and pagers
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions, signage, product specifications, catalogues, equipment manuals, databases, internet, material safety data sheets (MSDS) and graphical instructions • safe work procedures related to site and customer safety • regulatory/legislative requirements pertaining to commercial and retail operations and facilities • organisational work specifications and requirements • instructions issued by authorised enterprise or external persons • Australian standards

Unit Sector(s)

Unit sector	Sales and Parts, Administration and Management

Co-requisite units

Not applicable.

Competency field

Competency field	Sales and Marketing

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AURSCA2002 Present stock and sales area

Modification History

Release	Comment
Release 1	Replaces AURS238150A Present stock and sales area Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence required to establish and maintain stock and sales area. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit of competency applies to the following and should be contextualised to the qualification it is being applied: • retail, service and repair.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Maximise and maintain presentation of vehicle/ products for sale	1.1. Vehicle/product is clean and prepared to maximise market appeal in accordance with enterprise policies and procedures 1.2. Vehicle/product is placed in correct position to maximise presentation 1.3. Vehicle/product condition is monitored and action taken where necessary to maintain maximum market appeal
2. Maximise presentation of sales area	2.1. Presentation area is defined from floor plan in accordance with enterprise policies and procedures 2.2. Minimum vehicle/product numbers/types are determined and presented 2.3. Display areas are clean, tidy and safe 2.4. Correct handling, storage and display techniques are adopted according to vehicle/product types, enterprise and industry practices
3. Review acceptance of presentation of stock and sales area	3.1. Feedback from customers is sought 3.2. Customer feedback is collated and analysed 3.3. Action is taken

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
• collect, analyse and understand information related to feedback from customers • communicate ideas and information to draft presentation to management for support • plan and organise activities to design presentation area • work with others and in a team by involving other members of sales team in design and maintenance • use mathematical ideas and techniques to develop roster to maintain area • establish diagnostic processes for which design is both practical and safe • use workplace technology related to process feedback
Required knowledge
• enterprise policies and procedures • enterprise sales presentation area and floor plan arrangements • vehicle/product preparation and presentation techniques • vehicle/product models/types

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence in this unit signifies ability to transfer competence to changing circumstances and to respond to unusual circumstances in the critical aspects of: • presenting vehicle/products in a manner to maximise market appeal • maintaining suitable sales presentation area • communicating effectively with others involved in or affected by the work.

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EVIDENCE GUIDE	

Context of, and specific resources for assessment	• Underpinning knowledge and skills may be assessed on or off the job
	• The following are required:
	  • vehicle/products for sale
	  • suitable presentation area
	  • sales material (e.g. brochures, pamphlets, banners, flags, stands, ramps, turntables)
	  • a qualified workplace assessor.

Method of assessment	• Assessment of practical skills must take place only after a period of supervised practice and repetitive experience. If workplace conditions are not available, assessment in simulated workplace conditions is acceptable.
	• Prescribed outcome must be able to be achieved without direct supervision.
	• Practical assessments:
	  • present vehicle/products to maximise market appeal
	  • maintain maximum merchandising effect of sales presentation area.
	• Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.

Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Methods	Methods include: • application of vehicle/product preparation/presentation techniques • application of procedures for maximising

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RANGE STATEMENT	
	vehicle/product presentation area
WHS requirements	WHS requirements may include: • state/territory/industry WHS requirements
Resources may include	Resources may include • vehicles/products for sale • suitable presentation area • sales material (e.g. brochures, pamphlets, banners, flags, stands, ramps, turntables)
Information/documents	Sources of information/documents may include: • manufacturer/component supplier specifications • enterprise operating procedures • product manufacturer/component supplier specifications • customer requirements • industry/workplace codes of practice

Unit Sector(s)

Unit sector	Sales and Parts, Administration and Management

Co-requisite units

Not applicable.

Competency field

Competency field	Sales and Marketing

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AURSCA2003 Apply sales procedures

Modification History

Release	Comment
Release 1	Replaces AURS241303A Apply sales procedures Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence required to use sales techniques and encompasses key selling skills from approaching customer to closing sale. It requires a basic level of product knowledge. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit of competency applies to the following and should be contextualised to the qualification it is being applied: • retail, service and repair administration/sales selling products/services.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Demonstrate product knowledge	1.1. Knowledge of use and application of products and services is demonstrated 1.2. Experienced sales staff or product information guide are consulted to increase product knowledge
2. Approach customer	2.1. Timing of customer approach is determined and applied 2.2. Effective sales approach is identified and applied 2.3. Positive impression is conveyed to arouse customer interest 2.4. Knowledge of customer buying behaviour is demonstrated 2.5. Customer is focused on specific merchandise
3. Customer response	3.1. Questioning techniques are applied to determine customer buying motives 3.2. Listening skills are used to determine customer requirements 3.3. Non-verbal communication cues are interpreted and clarified 3.4. Customers are identified by name where possible

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ELEMENT	PERFORMANCE CRITERIA
4. Apply product knowledge	4.1. Customer needs are matched to products and services 4.2. Knowledge of product features and benefits are communicated clearly to customers 4.3. Product use and safety requirements are described to customers 4.4. Customers are referred to product specialist 4.5. Routine customer questions about merchandise, e.g. price, price reductions, quality and usage, are answered accurately and honestly or referred to more experienced sales staff
5. Gather information	5.1. Customer objections are identified and accepted 5.2. Objections are categorised into price, time and merchandise characteristics 5.3. Solutions are offered according to store policy 5.4. Problem solving is applied to overcome customer objections
6. Close sale	6.1. Customer buying signals are monitored, identified and responded to 6.2. Customer is encouraged to make purchase decision 6.3. Method of closing sale is selected and applied 6.4. Legislative and legal sales requirements/procedures are followed
7. Maximise sales opportunities	7.1. Opportunities for making additional sales are recognised and applied 7.2. Customer is advised of complementary products or services according to identified needs 7.3. Personal sales outcomes are reviewed to maximise future sales

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• collect, organise and understand information related to questioning customers to

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REQUIRED SKILLS AND KNOWLEDGE
gain information on need • communicate ideas and information to the operation of product and safety requirements • plan and organise activities for the development of a sales approach • work with others and in a team by consulting with experienced staff to develop product knowledge and sales techniques • use mathematical ideas and techniques for accurate processing and recording of sale and payment method • establish diagnostic processes which develop solutions to customer objections • use workplace technology related to the use of business technology in processing sale
Required knowledge
• technical information • equipment safety requirements • personal safety requirements • specific selling skills/sales techniques • sales/consumer legislation/legal requirements • vehicle/component details • automotive industry product knowledge

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence in this unit signifies ability to transfer competence to changing circumstances and to respond to unusual circumstances in the critical aspects of: • selling enterprise product and services to customers • interpreting and communicating information • the ability to communicate with customers • sales skills • communicating effectively with others involved in or

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EVIDENCE GUIDE	
	affected by the work

Context of, and specific resources for assessment	• Underpinning knowledge and skills may be assessed on or off the job
	• The following are required:
	  • a workplace or simulated workplace
	  • persons including customers and sales staff
	  • access to products
	  • documentation, store policy and procedures manuals, WHS, legislative and statutory requirements and industry codes of practice
	  • a qualified workplace assessor.

Method of assessment	• Assessment of practical skills must take place only after a period of supervised practice and repetitive experience. If workplace conditions are not available assessment, in simulated workplace conditions is acceptable
	• Prescribed outcome must be able to be achieved without direct supervision
	• Practical assessments:
	  • access, interpret and apply technical information
	  • apply sales techniques and product knowledge
	  • convey information both orally and in writing
	  • access, interpret and apply sales information
	  • sell products
	• Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.

Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and

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RANGE STATEMENT	
regional contexts) may also be included.	
Methods	Methods include: • face-to-face selling, telephone/electronic selling and product enquiries • verbal, written and practical demonstrations Other variables may include: • regular and new customers • sales may be face-to-face or telephone/electronic
Workplace health and safety (WHS) requirements	WHS requirements may include: • state/territory/industry WHS requirements
Resources	Resources may include: • product and services • customers • product and services • customers • videos, selling manuals, brochures, pamphlets, audio tapes • company/industry guidelines
Information/documents	Sources of information/documents may include: • manufacturer/component supplier specifications • enterprise operating procedures • product manufacturer/component supplier specifications • customer requirements • industry/workplace codes of practice

Unit Sector(s)

Unit sector	Sales and Parts, Administration and Management

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Co-requisite units

Not applicable.

Competency field

Competency field	Sales and Marketing

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AURSCA2004 Carry out cash, credit and funds transfers

Modification History

Release	Comment
Release 1	Replaces AURS241608A Carry out cash and/or credit/funds transfer transactions Unit code updated to meet policy requirements Minor change to unit title Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence required to undertake cash, cheque, credit/funds transfer card transactions. It also includes preparation and dispatch of debtor invoices. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit of competence applies to the following and should be contextualised to the qualification it is being applied: • retail, service and repair administration/sales finance - cash and non-cash transactions.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Handle cash transactions	1.1. Cash is received and counted 1.2. Correct balance is determined, taking price, invoices, discounts, etc. into account, and correct change is given 1.3. Irregularities are noted and referred to appropriate persons for resolution 1.4. Cash is stored according to enterprise policies and procedures 1.5. Receipts are issued and transaction documented according to enterprise policies and procedures
2. Handle credit/funds transfer card transactions	2.1. Correct documentation and equipment for particular credit/funds transfer card is identified and accessed 2.2. Credit/funds transfer card recording device is identified and accessed 2.3. Recording device is operated according to provider procedures and taking into account enterprise credit limits 2.4. Irregularities are noted and referred to appropriate

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ELEMENT	PERFORMANCE CRITERIA
	persons for resolution 2.5. Receipts are issued and transaction documented according to enterprise policies and procedures
3. Handle cheque transactions	3.1. Cheques are received and examined for correctness (amount, dates and signature) 3.2. Irregularities are noted and referred to appropriate persons for resolution 3.3. Cheques are stored according to enterprise policies and procedures 3.4. Receipts are issued and transaction documented according to enterprise policies and procedures
4. Carry out invoicing procedures	4.1. Calculations are performed to produce accurate customer invoices 4.2. Documentation is completed to ensure accuracy of content 4.3. Invoices are distributed to appropriate persons/section for certification prior to being dispatched 4.4. Verified invoices are dispatched within designated time limits 4.5. Invoices are copied and filed for auditing purposes according to enterprise policies and procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- collect, organise and understand information related to collation of cheques for processing
- communicate ideas and information on irregularities in cash balancing to appropriate persons
- plan and organise activities for the development of invoices
- work with others and in a team with office persons to develop invoices
- use mathematical ideas and techniques to count cash
- establish diagnostic processes which re-count cash and credit transactions to balance books

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REQUIRED SKILLS AND KNOWLEDGE
• use workplace technology related to record sales
Required knowledge
• money handling security methods • personal safety requirements • applicable legislation • GST information • equipment safety requirements • enterprise transaction policies • cash/credit/funds transfer systems

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence in this unit signifies ability to transfer competence to changing circumstances and to respond to unusual circumstances in the critical aspects of: • conducting cash and non-cash transactions • preparation of invoices • interpreting and communicating operational information • safe work practices • operation of office/sales equipment • communicating effectively with others involved in or affected by the work.

Context of, and specific resources for assessment	• Underpinning knowledge and skills may be assessed on or off the job
	• The following are required:
	  • cash and non-cash transaction equipment
	  • computer software/hardware, calculator, office equipment, enterprise stationery, safes, cash register, EFTPOS systems, credit card systems, stock scanning/

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EVIDENCE GUIDE	
	pricing equipment, postage equipment • a qualified workplace assessor.
Method of assessment	• Assessment of practical skills must take place only after a period of supervised practice and repetitive experience. If workplace conditions are not available assessment in simulated workplace conditions is acceptable • Prescribed outcome must be able to be achieved without direct supervision • Practical assessments: • recognise denominations of Australian currency notes and coinage • access and apply cash/credit systems • receive cash, perform calculations and give correct change • use equipment • handle cash correctly • use security systems (where applicable) • prepare and dispatch invoices • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Methods	Methods include: • conducting sales transactions using cash and non-cash procedures • telephone, fax, written communication, verbal

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RANGE STATEMENT	
	• preparation of debtor invoices Specific requirements may include: • literacy/numeracy
Workplace health and safety (WHS) requirements	WHS requirements may include: • state/territory/industry WHS requirements
Resources	Resources may include: • cash and non-cash transaction equipment • invoice dispatching system • computer software/hardware, calculators, office equipment, enterprise stationery, safes, cash register, EFTPOS systems, credit card systems, stock scanning/ pricing equipment, postage equipment
Information/documents	Sources of information/documents may include: • enterprise operating procedures • job cards • product manufacturer/component supplier specifications • company stationery • customer requirements • industry/workplace codes of practice

Unit Sector(s)

Unit sector	Sales and Parts, Administration and Management

Co-requisite units

Not applicable.

Competency field

Competency field	Sales and Marketing

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AURSCA2005 Sell products

Modification History

Release	Comment
Release 1	Replaces AURS241769A Sell product(s) Unit code updated to meet policy requirements Minor changes to unit title Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence required to make best use of time available, use specific sales techniques, and follow procedures for product delivery and customer follow-up. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit of competence applies to the following and should be contextualised to the qualification it is being applied: • retail, service and repair.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Present and demonstrate product to customer	1.1. Product is presented to customer to maximise its features and market appeal in relation to customer perceived needs 1.2. Product features, fittings, controls and accessories are shown and talked through with customer and operated where necessary 1.3. Customer is offered a test operation
2. Obtain customer agreement to purchase product	2.1. Price for product is negotiated and agreed 2.2. Sale is made using closing technique according to automotive industry/enterprise policies and procedures 2.3. Sale is made in accordance with legal requirements
3. Perform product delivery and customer follow-up procedures	3.1. Product is delivered to customer in accordance with manufacturer/component supplier specification and industry/enterprise policies and procedures 3.2. Customer satisfaction is determined, remedial action is taken where necessary to maximise repeat business possibilities

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ELEMENT	PERFORMANCE CRITERIA
4. Use prospecting methods to locate potential market	4.1. Potential customers are identified by follow-up of enterprise records of existing/past customers, service area customers, industry contacts and advertising strategies 4.2. Plans are developed to contact potential customers

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- collect, organise and understand information related to collect and interpret technical information
- communicate ideas and information to convey information to the customer
- plan and organise activities for sales demonstration
- work with others and in a team by consulting with experienced staff
- use mathematical ideas and techniques to include customer limitations of price and time in recommendations
- establish diagnostic processes which have legal requirements included in recommendations
- use workplace technology related to record sales

Required knowledge

- selling procedures
- communication skills (oral and written)
- communication techniques
- product information
- company policies and procedures
- stock presentation techniques
- industry legal requirements
- finance, leasing and insurance contracts/policies

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence in this unit signifies ability to transfer competence to changing circumstances and to respond to unusual circumstances in the critical aspects of: • selling products to satisfy customer needs • use of sales techniques • communicating effectively with others involved in or affected by the work.

Context of, and specific resources for assessment	• Underpinning knowledge and skills may be assessed on or off the job
	• The following are required:
	  • a workplace or simulated workplace
	  • sales manuals, time management guides, enterprise/ industry guidelines and office equipment (e.g. computer, typewriter, telephone and fax)
	  • sales videos, sales brochures
	  • enterprise-based sales recording systems
	  • various products retailed via automotive industry
	  • a qualified workplace assessor.

Method of assessment	• Assessment of practical skills must take place only after a period of supervised practice and repetitive experience. If workplace conditions are not available assessment in simulated workplace conditions is acceptable
	• Prescribed outcome must be able to be achieved without direct supervision
	• Practical assessments:
	  • sell product(s) to satisfy customer needs in accordance with enterprise policies and procedures
	  • use specific sales techniques
	  • convey information both orally and in writing
	  • access, interpret and apply sales information
	  • apply time management techniques
	• Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Methods	Methods include: • demonstration to customer using sales techniques applied to product sold for or through automotive industry • verbal, written, practical • customers may be face to face or by telephone/ electronic media
Workplace health and safety (WHS) requirements	WHS requirements may include: • state/territory/industry WHS requirements
Resources	Resources may include: • sales manuals, time management guides, enterprise/industry guidelines, office equipment (e.g. computer, typewriter, telephone and fax) • sales videos, sales brochures • enterprise-based sales recording systems • various products retailed via automotive industry
Information/documents	Sources of information/documents may include: • enterprise operating procedures • product manufacturer/component supplier specifications • customer requirements

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RANGE STATEMENT	
	• industry/workplace codes of practice

Unit Sector(s)

Unit sector	Sales and Parts, Administration and Management

Co-requisite units

Not applicable.

Competency field

Competency field	Sales and Marketing

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AURSCA2006 Promote products and services

Modification History

Release	Comment
Release 1	Replaces AURS242621A Promote products and services Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence required to promote and sell products and services to current and potential customers, establish on-sell opportunities in a sales situation, and recommend complementary products and services to customers. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit of competence applies to the following and should be contextualised to the qualification it is being applied: • retail, service and repair.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Promote products and services to customers	1.1. Explanations/demonstrations, where applicable, are conducted professionally 1.2. Product benefits and relevance of product to customer needs are highlighted during demonstration 1.3. Selling techniques are employed based on accepted and industry standards, legal requirements and enterprise policy
2. Establish on-sell opportunities	2.1. Customer interest areas and needs are identified 2.2. On-sell opportunities are assessed through knowledge of customer needs and interests, and enterprise products and services 2.3. Explanations are aligned to customer interest areas and needs 2.4. Customer needs for complementary products or services are determined
3. Recommend complementary products or services	3.1. Complementary products or services of benefit to customer are identified 3.2. Benefits of product or service are discussed with

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ELEMENT	PERFORMANCE CRITERIA
to customers	customer 3.3. Cost estimates are prepared and documented

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• collect, organise and understand information related to customer information when collected and analysed for on-selling • communicate ideas and information when features and benefits are explained to customers • plan and organise activities when promotions are planned and organised • work with others and in a team by seeking involvement of team members • use mathematical ideas and techniques when cost estimates are prepared for promotions • establish diagnostic processes having cost and time limitations when considered in recommendations • use workplace technology related to business technology used to prepare cost estimates
Required knowledge
• workplace health and safety (WHS) • oral and written communication skills for application • buyer behaviour • selling procedures/techniques • product and service promotional procedures for application • legislation/regulations/guidelines applicable to the industry sector • advertising codes of practice

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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EVIDENCE GUIDE	
Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence in this unit signifies ability to transfer competence to changing circumstances and to respond to unusual circumstances in the critical aspects of: • promoting products and services to customers and establishing on-selling opportunities • communicating effectively with others involved in or affected by the work.

Context of, and specific resources for assessment	• Underpinning knowledge and skills may be assessed on or off the job
	• The following are required:
	  • products for sale
	  • suitable presentation area
	  • sales material (e.g. brochures, pamphlets, banners, flags, stands, ramps, turntables)
	  • a qualified workplace assessor.

Method of assessment	• Assessment of practical skills must take place only after a period of supervised practice and repetitive experience. If workplace conditions are not available assessment, in simulated workplace conditions is acceptable
	• Prescribed outcome must be able to be achieved without direct supervision
	• Practical assessments:
	  • behave professionally in a manner appropriate to the situation and customer needs
	  • demonstrate a range of products in a professional manner
	  • apply promotional sales techniques to a range of sales situations and customer needs
	• Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Promotion	Promotion may include: • planned sales presentation, territory management and account management
Selling	Selling may include: • face to face, telephone, direct mail and internet
Sales	Sales may include: • individual customers • organisational customers • new products • second-hand products
Professional explanations/ demonstrations	Professional explanations/demonstrations may include: • parts • products • services
Customer needs	Customer needs may include: • time limitations • cost limitations • value for money • quality of work/product • after-sales service
Industry standards	Industry standards for selling products and services include those relating to: • fair trade • consumer protection • ethical behaviour • WHS requirements • legislative requirements • credit legislation

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RANGE STATEMENT	
Complementary products/services	Complementary products/services may include: • accessories • additional service/repair work • additional vehicle features
WHS requirements	WHS requirements may include: • state/territory/industry WHS requirements
Resources may include	Resources may include: • enterprise stationery, telephone, merchandising kit and pricing policy
Information/documents	Sources of information/documents may include: • enterprise operating procedures • product manufacturer/component supplier specifications • customer requirements • industry/workplace codes of practice

Unit Sector(s)

Unit sector	Sales and Parts, Administration and Management

Co-requisite units

Not applicable.

Competency field

Competency field	Sales and Marketing

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AURSLA2001 Apply legal requirements relating to product sale

Modification History

Release	Comment
Release 1	Replaces AURS241803A Apply legal requirements relating to product sales Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the competence required to access, interpret and apply legal requirements relating to sale of products. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit of competence applies to the following and should be contextualised to the qualification it is being applied: • retail, service and repair - administration/sales product sales.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify legislation and documentation to sell product(s)	1.1. Legislation to sell product(s) is correctly identified and accessed where necessary 1.2. Product documentation and manuals are identified and available for customers
2. Apply legislation to sell product(s)	2.1. Product(s) are sold in accordance with identified legal requirements, including duty of care 2.2. Customer transaction is handled in accordance with consumer legislation
3. Record necessary information on product sales documentation	3.1. Correct product sales documentation is identified and accessed in accordance with enterprise policies and procedures 3.2. Required information is clearly and accurately provided to complete legal requirements for correct documentation 3.3. Customer is requested to sign acknowledgement of information provided, such as operation instructions for product, safety requirements and supply of manual for product

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
• collect, organise and understand information related to legislative requirements • communicate ideas and information to explain safety and operation issues for products • plan and organise activities to demonstrate safe operation of products • work with others and in a team by consulting with experienced staff • use mathematical ideas and techniques to have cost and time limitations included in demonstrations • establish diagnostic processes recommending safe operating procedures • use workplace technology related to the demonstration of safe operation of products
Required knowledge
• product sales legislation • enterprise sales documentation procedures and policies

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence in this unit signifies ability to transfer competence to changing circumstances and to respond to unusual circumstances in the critical aspects of: • identifying and correctly interpreting legal requirements for product sales • application of legal requirements to product sales

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EVIDENCE GUIDE	
	• correctly completing required documentation to record sale • communicating effectively with others involved in or affected by the work.

Context of, and specific resources for assessment	• Underpinning knowledge and skills may be assessed on or off the job
	• The following are required:
	  • documentation to fulfil legal requirements and enterprise policies
	  • product manuals
	  • a qualified workplace assessor.

Method of assessment	• Assessment of practical skills must take place only after a period of supervised practice and repetitive experience. If workplace conditions are not available assessment in simulated workplace conditions is acceptable • Prescribed outcome must be able to be achieved without direct supervision • Practical assessments: • access, interpret and apply legal requirements to sale of products • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Methods	Methods include: • customer contact skills

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RANGE STATEMENT	
	• identifying and adhering to legal requirements • operation of products and safety requirements explained to and verified by the customer • customer acknowledgement of user manuals provided
Workplace health and safety (WHS) requirements	WHS requirements may include: • state/territory/industry WHS requirements • duty of care
Resources	Resources may include: • documentation to fulfil legal requirements and enterprise policies • manuals, stationery • copies of legislation • product for sale
Information/documents	Sources of information/documents may include: • manufacturer/component supplier specifications • enterprise operating procedures • product manufacturer/component supplier specifications • customer requirements • industry/workplace codes of practice

Unit Sector(s)

Unit sector	Sales and Parts, Administration and Management

Co-requisite units

Not applicable.

Competency field

Competency field	Regulator or Legal

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AURTNA5001 Estimate and calculate costs to repair, maintain or modify a vehicle

Modification History

Release	Comment
Release 1	Replaces AURT577727B Estimate and calculate costs to repair, maintain or modify a vehicle Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation

Unit Descriptor

Unit descriptor	This unit of competency describes the skills and knowledge required to estimate and calculate the costs to repair, maintain or modify a vehicle taking into account materials, labour and overhead costs. It requires the ability to estimate and calculate costs, analyse information, and report and document the costs. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Application of the Unit

Application of the unit	This unit applies to individuals who estimate and calculate the cost to repair, maintain or modify a vehicle in the vehicle repair and vehicle loss assessing industries. This calculation would normally be undertaken by the owner of the business as it incorporates materials, labour and overhead costs. Vehicles may include light vehicles, heavy vehicles, agricultural and plant equipment, recreational boats, recreational vehicles and motorcycles.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Gather information	1.1. Clarify the particular service required 1.2. Obtain and analyse details of the proposed service requirements 1.3. Obtain labour unit cost projections 1.4. Obtain and analyse logistic support contracts, supply agreements or equivalent 1.5. Obtain details of any proposed warehousing and physical distribution systems and related cost factors 1.6. Document and store information ready for retrieval and application
2. Estimate materials and labour	2.1. Estimate cost of repair time 2.2. Estimate labour requirements for direct services and related operations 2.3. Estimate cost of subcontractor work 2.4. Estimate type and cost of parts and materials according to industry and enterprise pricing standards 2.5. Document final estimate
3. Determine and	3.1. Determine components contributing to overhead

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ELEMENT	PERFORMANCE CRITERIA
calculate overheads	costs 3.2. Calculate overhead costs to be attributed to the work in accordance with commercial and enterprise procedures
4. Calculate costs	4.1. Cost repair time in accordance with enterprise procedures 4.2. Cost direct labour costs and subcontractor work 4.3. Cost parts and materials 4.4. Calculate total job cost, including overheads and mark-up percentages in accordance with enterprise procedures 4.5. Calculate total service cost 4.6. Note potential quotation variations 4.7. Record cost calculations
5. Document and verify details	5.1. Document details of costs and charges in accordance with enterprise procedures 5.2. Verify costs, calculations and other details with relevant enterprise person 5.3. Document and file details for future reference and in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • technical skills to the level required to use internet and other workplace technology related to calculating work costs • communication skills to the level required to verify costs with others, to report work outcomes and problems, and to relate to people from a range of social, cultural and ethnic backgrounds and of varying physical and mental abilities • literacy skills to the level required to undertake costing research, and to document and report findings • numeracy skills to the level required to estimate and calculate labour, materials and on-costs and to validate work costs

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REQUIRED SKILLS AND KNOWLEDGE
• problem-solving skills to the level required to anticipate costing problems and to avoid reworking, wastage, and planning and scheduling problems • team skills to the level required to work effectively and cooperatively with others to optimise workflow and productivity
Required knowledge
Required knowledge includes: • methods and processes for identifying, apportioning, summarising and validating total costs for work • components of labour costs • current assessing and quoting methodologies • commercial approaches to warehousing and physical distribution and costing • manufacturer and component supplier specifications and manuals, including costing catalogues • applicable commonwealth, state or territory legislation, regulations, standards and codes of practice, including workplace health and safety (WHS), personal safety and environment, relevant to calculating vehicle repair, maintenance and modification costs • organisational policies and procedures, including quality requirements, reporting and recording procedures, related to calculating vehicle repair, maintenance and modification costs

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Critical aspects of evidence	Assessors must be satisfied that the candidate can competently and consistently: • observe safety procedures and requirements • communicate effectively with others involved in or affected by the work • select appropriate methods and techniques • interpret proposals, specifications and instructions for the work • obtain information relevant to the determination of costs

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EVIDENCE GUIDE	
	• calculate and cost accurately the quantities of parts and materials, the amount of labour and time required to complete the work, and overheads for a range of vehicle repair, maintenance and modification quotes • document the process and outcomes in accordance with enterprise practice.

Context of assessment	• The application of competency is to be assessed in the workplace or a simulated environment that reflects as far as possible the actual working environment.
	• Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints.
	• Assessment is to comply with relevant regulatory requirements, including specified Australian standards.
	• Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
	• The following resources should be made available:
	  • vehicles requiring repair that can be used for quotations
	  • appropriate worksite and costing details
	  • manufacturer and component costs, labour rates, commercial and industry information
	  • Repair Times manuals
	  • equipment, including calculators, computer and software
	  • internet access
	  • enterprise procedures.

Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of this Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of Required Skills and Knowledge. • Assessment methods must be by direct observation of tasks and include questioning on Required Skills and Knowledge to ensure its correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that

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EVIDENCE GUIDE	
	competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.
Specific resource requirements for this unit	Assessment processes and techniques must be culturally sensitive and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Service requirements	Service requirements may include: • specialised work • subcontracting • replacement parts • repair timeframe
Overhead costs	Overhead costs may include: • rental and leasing costs • utilities • non-production resources • depreciation of plant and equipment • warehousing margins • warehousing costs • insurance and other costs incurred by doing business • material/supply costs, including catalogues, contracts, standing agreements, market rates and warehousing margins
Information/documents	Information/documents may include:

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RANGE STATEMENT	
	• Motor Vehicle Insurance and Repair Industry Code of Conduct • verbal, written and graphical instructions • parts listing prices and catalogues • inventory systems • material safety data sheets (MSDS) • diagrams or sketches • safe work procedures for inspection of vehicles for saleable components • engineer's design specifications and instructions • workplace specifications and requirements • instructions issued by authorised enterprise or external persons • Australian standards • current driver's licence
Legislative requirements	Legislative requirements are to be in accordance with applicable commonwealth, state or territory legislation, regulations, certification requirements and codes of practice, and may include: • award and enterprise agreements • industrial relations • Australian standards • Australian Design Rules • confidentiality and privacy • WHS • the environment • equal opportunity • anti-discrimination • duty of care
WHS requirements	WHS requirements are to be in accordance with applicable commonwealth, state or territory legislation and regulations, and organisational safety policies and procedures, and may include: • personal protective equipment and clothing • safety equipment • first aid equipment • hazard and risk control • elimination of hazardous materials and substances

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RANGE STATEMENT	
	• manual handling, including shifting, lifting and carrying • emergency procedures • road rules • safe driving policy
Environmental requirements	Environmental requirements may include: • waste management • noise • dust • clean-up management
Organisational policies and procedures	Organisational policies and procedures may include: • financial management • cost and apportioning overheads • labour employment costs, including awards and contracts • quality policies and procedures, including Australian standards • WHS, sustainability, environment, equal opportunity and anti-discrimination • manufacturer specifications and industry codes of practice • safe work procedures • reporting and recording procedures

Unit Sector(s)

Unit sector	Mechanical Miscellaneous

Co-requisite units

Not applicable.

Competency field

Competency field	Loss Assessment or Repair Quoting

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AURTTA3017 Carry out vehicle safety and roadworthy inspections

Modification History

Release	Comment
Release 1	Replaces AURT365508A Carry out vehicle safety/roadworthy inspection Unit code updated to meet policy requirements Minor changes to unit title Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit covers the competence required to complete a vehicle safety inspection and to report on findings compared with standards by vehicle manufacturer/component supplier, legislation, regulatory bodies and industry organisations. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit of competence applies to the following and should be contextualised to the qualification to which it is being applied. Work requires individuals to demonstrate judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare to undertake a vehicle safety inspection	1.1. Nature and scope of work requirements are identified and confirmed 1.2. WHS requirements, including individual State/Territory regulatory requirements and personal protection needs are observed throughout the work 1.3. Procedures and information such as workshop manuals and specifications, and tooling, are sourced 1.4. Method options are analysed and those most appropriate to the circumstances are selected and prepared 1.5. Technical and/or calibration requirements for inspection are sourced and support equipment is identified and prepared
2. Complete vehicle	2.1. Correct information is accessed and interpreted from

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ELEMENT	PERFORMANCE CRITERIA
inspection	appropriate sources to enable inspection to conform to standards and procedures 2.2. Vehicle inspection is carried out using approved methods and equipment, according to specifications and tolerances relative to the vehicle 2.3. Inspection is completed without causing damage to any component or system 2.4. Vehicle components are compared to manufacturer/ component supplier specifications
3. Report findings	3.1. Vehicle inspection report is completed in approved format 3.2. Vehicle system tolerances outside vehicle manufacturer/ component supplier specifications are highlighted and drawn to the attention of customer and/or reported 3.3. Records relating to vehicle safety inspections are processed in accordance with company policy 3.4. Inspection is completed within enterprise guidelines 3.5. Inspections are carried out according to industry regulations/guidelines, WHS legislation, legislation and enterprise procedures/policies
4. Prepare vehicle for customer delivery	4.1. Inspection documentation is completed 4.2. Final inspection is made to ensure safety features are in place 4.3. Vehicle is presented to workplace expectations 4.4. Job card is completed and delivered to appropriate persons

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• apply research and interpretive skills sufficient to locate, interpret and apply manufacturer/component supplier procedures, workplace policies and procedures • apply analytical skills for identification and analysis of technical information • apply plain English literacy and communication skills in relation to dealing with customers and team members

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REQUIRED SKILLS AND KNOWLEDGE
• apply questioning and active listening skills for example when obtaining information from customers • apply oral communication skills sufficient to convey information and concepts to customers • apply planning and organising skills to own work activities, including making good use of time and resources, sorting out priorities and monitoring own performance • interact effectively with other persons both on a one-to-one basis and in groups, including understanding and responding to the needs of a customer and working effectively as a member of a team to achieve a shared goal • establish safe and effective work processes which anticipate and/or resolve problems and downtime, to systematically develop solutions to avoid or minimise reworking and avoid wastage • use mathematical ideas and techniques to correctly calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks • use workplace technology related to vehicle safety/ roadworthy inspections, including the use of specialist tooling, measuring equipment, computerised technology and communication devices and the documenting/recording of results
Required knowledge
A working knowledge of: • WHS regulations/requirements, equipment, material and personal safety requirements • Australian Design Rules • vehicle/component inspection procedures • inspection checklists • enterprise quality procedures • work organisation and planning processes

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to	It is essential that competence in this unit signifies ability to transfer competence to changing circumstances and to

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EVIDENCE GUIDE	
demonstrate competency in this unit	respond to unusual circumstances in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • conducting inspection in accordance with regulatory and/or workplace requirements • interpreting condition of the components compared with manufacturer/component supplier specifications • inspection of vehicle and its associated components within workplace timeframes • completing the written inspection report • vehicle presentation to customer in compliance with workplace requirements
Context of, and specific resources for assessment	Application of competence is to be assessed in the workplace or simulated worksite Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints Assessment is to comply with regulatory requirements, including Australian Standards The following resources should be made available: • workplace location or simulated workplace • material relevant to vehicle safety/roadworthy inspections • equipment, hand and power tooling appropriate to vehicle safety/roadworthy inspections • activities covering mandatory task requirements • specifications and work instructions
Method of assessment	Assessment must satisfy the endorsed assessment guidelines of the automotive industry's RS&R Training Package Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies Assessment may be applied under project related conditions

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EVIDENCE GUIDE	
	and require evidence of process Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Methods	Methods include conducting a vehicle inspection by vehicle manufacturer/component supplier, State/Territory legislation, industry practices and/or customer requirements
WHS	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and

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RANGE STATEMENT	
	substances
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulation/codes of practice and workplace policies and practices
Safe operating procedures	Safe operating procedures are to include, but are not limited to operational risk assessment and treatments associated with vehicular movement, toxic substances, electrical safety, machinery movement and operation, manual and mechanical lifting and shifting, working in proximity to others and site visitors
Emergency procedures	Emergency procedures related to this unit are to include but may not be limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation
Environmental requirements	Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management
Quality requirements	Quality requirements are to include, but are not limited to regulations, including Australian Standards, internal company quality policy and standards and enterprise operations and procedures
Statutory/regulatory authorities	Statutory/regulatory authorities may include Federal, State/Territory and local authorities administering acts, regulations and codes of practice
Tooling and equipment	Tooling and equipment may include hand or hand-held power tooling, ramps, hoists, pits, measuring equipment, specialist tooling for removal and testing equipment, including meters and gauges
Materials	Materials may include vehicle protection and cleaning materials
Communications	Communications are to include, but are not limited to verbal and visual instructions and fault documenting and may include site specific

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RANGE STATEMENT	
	instructions, written instructions, plans or instructions related to job/task, telephones and pagers
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches • safe work procedures related to vehicle safety/roadworthy inspections • regulatory/legislative requirements pertaining to vehicle safety • engineer's design specifications and instructions • organisation work specifications and requirements • instructions issued by authorised enterprise or external persons • Australian Standards

Unit Sector(s)

Unit sector	Mechanical Miscellaneous

Co-requisite units

Not applicable.

Competency field

Competency field	Technical

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AURTTB2001 Inspect and service braking systems

Modification History

Release	Comment
Release 1	Replaces AURT210170A Inspect and service braking systems Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit covers the competence required to inspect and service braking systems and/or associated components, including pneumatic over hydraulic, air, hand and parking brake systems in an automotive retail, service and/or repair context. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	This unit of competency refers to braking systems associated with automotive retail, service and repair and should be contextualised to the level of qualification to which it is being applied: • light vehicle, heavy vehicle, motorcycle or trailer or outdoor power equipment. The unit includes identification and confirmation of work requirement, preparation for work, conduct of brake system wear analysis, servicing of braking systems and completion of work finalisation processes, including clean-up and documentation. Work requires individuals to demonstrate judgement and problem-solving skills in managing own work activities

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	and contributing to a productive team environment within the scope of this unit. This includes an understanding of the level of work to be performed.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. **Prepare to undertake braking system inspection**	1.1. Nature and scope of work requirements are identified and confirmed 1.2. WHS requirements, including individual State/Territory regulatory requirements and personal protection needs are observed throughout the work 1.3. Procedures and information such as workshop manuals and specifications, and tooling required, are sourced

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ELEMENT	PERFORMANCE CRITERIA
	1.4. Methods appropriate to the circumstances are selected and prepared in accordance with standard operating procedures 1.5. Resources required for inspection of braking systems are sourced and support equipment is identified and prepared 1.6. Warnings in relation to working with braking systems are observed
2. **Conduct braking system wear analysis**	2.1. Braking system analysis is implemented in accordance with road safety legislation, workplace procedures and manufacturer/component supplier specifications 2.2. Brake wear measurement results are compared with manufacturer/component supplier specifications to indicate compliance or non-compliance 2.3. Results are documented with evidence and supporting information and recommendation(s) made 2.4. Report is processed in accordance with workplace procedures
3. **Prepare to service braking system and/or associated components**	3.1. WHS requirements, including individual State/Territory regulatory requirements and personal protection needs are observed throughout the work 3.2. Procedures and information required are identified and sourced 3.3. Resources required for servicing braking systems are identified and support equipment is identified and prepared
4. **Carry out servicing of braking systems and/or associated components**	4.1. Servicing is implemented in accordance with workplace procedures and manufacturer/component supplier specifications 4.2. Adjustments made during the servicing are in accordance with manufacturer/component supplier specifications
5. **Prepare equipment for use or storage**	5.1. Servicing schedule documentation is completed 5.2. Final inspection is made to ensure protective features are in place 5.3. Final inspection is made to ensure work is to workplace expectations 5.4. Equipment is cleaned for use or storage to workplace expectations 5.5. Job card is processed in accordance with workplace

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ELEMENT	PERFORMANCE CRITERIA
	procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- apply research and interpretive skills sufficient to locate, interpret and apply manufacturer/component supplier procedures, workplace policies and procedures
- apply analytical skills required for identification and analysis of technical information
- apply plain English literacy and communication skills in relation to dealing with customers and team members
- apply questioning and active listening skills for example when obtaining information from customers
- apply oral communication skills sufficient to convey information and concepts to customers
- apply planning and organising skills to own work activities, including making good use of time and resources, sorting out priorities and monitoring one's own performance
- interact effectively with other persons both on a one-to-one basis and in groups, including understanding and responding to the needs of a customer and working effectively as a member of a team to achieve a shared goal
- establish safe and effective work processes which anticipate and/or resolve problems and downtime, to systematically develop solutions to avoid or minimise reworking and avoid wastage
- use mathematical ideas and techniques to correctly calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks
- use workplace technology related to the inspection and servicing of braking systems, including the use of servicing tooling and equipment, measuring equipment, computerised technology and communication devices and the reporting/ documenting of results

Required knowledge

A working knowledge of:

- WHS and environmental regulations/requirements, equipment, material and personal safety requirements
- dangers of working with braking systems

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REQUIRED SKILLS AND KNOWLEDGE
• operating principles of braking systems, components and their relationship to each other • types and layout of service/repair manuals (hard copy and electronic) • analysis procedures • servicing procedures • enterprise quality procedures • work organisation and planning processes

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence in this unit signifies ability to transfer competence to changing circumstances and to respond to unusual circumstances in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • conducting the inspection in accordance with workplace and manufacturer/component supplier requirements • accurately interpreting wear analysis results • completing service of braking systems in accordance with workplace and manufacturer/component supplier requirements • completing service of braking systems and associated components within workplace timeframes • equipment is presented to customer in compliance with workplace requirements
Context of, and specific resources for assessment	Application of competence is to be assessed in the workplace or simulated worksite Assessment is to occur using standard and authorised work

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EVIDENCE GUIDE	
	practices, safety requirements and environmental constraints Assessment is to comply with regulatory requirements, including Australian Standards The following resources should be made available: • workplace location or simulated workplace • material relevant to the inspection and servicing of braking systems • equipment, hand and power tooling appropriate to the inspection and servicing of braking systems • activities covering mandatory task requirements • specifications and work instructions
Method of assessment	Assessment must satisfy the endorsed assessment guidelines of the automotive industry's RS&R Training Package Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies Assessment may be applied under project related conditions and require evidence of process Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Braking systems	Types of braking systems may include: • hydraulic • mechanical • pneumatic
System components	System components may include: • disc pads • master cylinders • brake shoes • brake callipers • brake hoses • brake actuators • mechanical devices • valves
Methods	Methods are to include: • visual, aural and functional assessments (including damage, corrosion, fluid leaks, wear) • measurements of pedal travel, free-play, disc runout, disc thickness, drum wear and pad/lining thickness
WHS	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulations/codes of

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RANGE STATEMENT	
	practice and workplace policies and practices
Safe operating procedures	Safe operating procedures are to include, but are not limited to the conduct of operational risk assessment and treatments associated with vehicular movement, hazardous substances, machinery movement and operation, manual lifting and shifting, working in proximity to others and site visitors
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to emergency shutdown and stopping of equipment, operating safely in the event of fires, enterprise first aid requirements and site evacuation
Environmental requirements	Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management
Quality requirements	Quality requirements are to include, but are not limited to regulations, including Australian Standards, internal company quality policy and standards and enterprise operations and procedures
Statutory/regulatory authorities	Statutory/regulatory authorities may include Federal, State/Territory and local authorities administering acts, regulations and codes of practice
Tooling and equipment	Tooling and equipment may include hand tooling, gauges (including dial, verniers and micrometers), bleeding and brake testing devices, dust extraction equipment and grease guns
Materials	Materials may include lubricants, fluids, minor spare parts and cleaning materials
Communications	Communications are to include, but are not limited to verbal and visual instructions and fault reporting and may include site specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers

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RANGE STATEMENT	
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches • safe work procedures related to the inspection and servicing of braking systems • regulatory/legislative requirements pertaining to the automotive industry, including Australian Design Rules • engineer's design specifications and instructions • organisation work specifications and requirements • instructions issued by authorised enterprise or external persons • Australian Standards

Unit Sector(s)

Unit sector	Mechanical Miscellaneous

Co-requisite units

Not applicable.

Competency field

Competency field	Technical - Brakes

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AURTTD2004 Inspect and service suspension systems

Modification History

Release	Comment
Release 1	Replaces AURT216170A Inspect and service suspension systems Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit covers the competence required to carry out the service of suspension systems and associated components in an automotive retail, service and/or repair context. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	The unit includes identification and confirmation of work requirement, preparation for work, inspection, analysis and servicing of suspension systems and completion of work finalisation processes, including clean-up and documentation. This unit of competence refers to servicing suspension systems in an automotive retail, service and/or repair environment and should be contextualised to the level of the qualification to which it is being applied. Work requires individuals to demonstrate discretion, judgement and problem-solving skills in managing own work activities and contributing to a productive team environment within the scope of this unit. This includes an understanding of the level of work to be performed.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. **Prepare to inspect and service suspension systems and associated components**	1.1. Nature and scope of work requirements are identified and confirmed 1.2. WHS requirements, including individual State/Territory regulatory requirements and personal protection needs are observed throughout the work 1.3. Procedures and information such as workshop manuals and specifications, and tooling required, are sourced 1.4. Methods appropriate to the circumstances are selected and prepared in accordance with standard operating procedures 1.5. Resources required for servicing suspension systems are sourced and support equipment and tooling are

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ELEMENT	PERFORMANCE CRITERIA
	identified and prepared 1.6. Warnings in relation to working with wheeled and/or tracked equipment are observed
2. **Conduct inspection and analysis**	2.1. Inspection is implemented in accordance with workplace procedures and manufacturer/component supplier specifications 2.2. Inspection results are compared with manufacturer/ component supplier specifications to indicate compliance or non-compliance 2.3. Results are documented with evidence and supporting information and recommendation(s) made 2.4. Report is forwarded to persons for action in accordance with workplace procedures
3. **Carry out service**	3.1. Service are implemented in accordance with workplace procedures and manufacturer/component supplier specifications 3.2. Adjustments made during the service are in accordance with manufacturer/component supplier specifications
4. **Prepare vehicle/ equipment for use or storage**	4.1. Service schedule documentation is completed 4.2. Final inspection is made to ensure protective guards, safety features and cowlings are in place 4.3. Final inspection is made to ensure work is to workplace expectations 4.4. Vehicle/equipment is cleaned for use or storage to workplace expectations 4.5. Job card is processed in accordance with workplace procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• apply research and interpretive skills sufficient to locate, interpret and apply manufacturer/component supplier procedures, workplace policies and procedures • apply analytical skills required for identification and analysis of technical

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REQUIRED SKILLS AND KNOWLEDGE
information • apply plain English literacy and communication skills in relation to dealing with customers and team members • apply questioning and active listening skills for example when obtaining information from customers • apply oral communication skills sufficient to convey information and concepts to customers • apply planning and organising skills to own work activities, including making good use of time and resources, sorting out priorities and monitoring one's own performance • interact effectively with other persons both on a one-to-one basis and in groups, including understanding and responding to the needs of a customer and working effectively as a member of a team to achieve a shared goal • establish safe and effective work processes which anticipate and/or resolve problems and downtime, to systematically develop solutions to avoid or minimise reworking and avoid wastage • use mathematical ideas and techniques to correctly calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks • use workplace technology related to the inspection and service of suspension systems, including the use of measuring equipment, computerised technology, specialist tooling and testing devices communication devices, the reporting/documenting of results and diagnostic and specialised tooling and equipment
Required knowledge
A working knowledge of: • WHS regulations/requirements, equipment, material and personal safety requirements • operating principles of suspension systems relevant to the qualification to which it is applied • dangers of working with stored energy • types and layout of service/repair manuals (hard copy and electronic) • suspension system servicing procedures • suspension system testing procedures • enterprise quality procedures • work organisation and planning processes

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • conducting the inspection and servicing a range of suspension systems in accordance with workplace and manufacturer/component supplier requirements • accurately interpreting test results • completing service of suspension system and associated components within workplace timeframes • vehicle/equipment is presented to customer in compliance with workplace requirements
Context of, and specific resources for assessment	Application of competence is to be assessed in the workplace or simulated worksite Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints Assessment is to comply with regulatory requirements, including Australian Standards The following resources should be made available: • workplace location or simulated workplace • material relevant to the inspection and servicing of suspension systems • equipment, hand and power tooling appropriate to the inspection and servicing of suspension systems • activities covering mandatory task requirements • specifications and work instructions

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EVIDENCE GUIDE	
Method of assessment	Assessment must satisfy the endorsed assessment guidelines of the automotive industry's RS&R Training Package Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies Assessment may be applied under project related conditions and require evidence of process Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Suspension systems	Suspension systems may be gas, hydraulic, pneumatic, mechanical and rubber suspension, and found on light and heavy vehicles, trailers, motorcycles and outdoor power equipment

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RANGE STATEMENT	
Systems	Systems may include lateral and longitudinal arms, independent suspension, ball joints, rose joints, self levelling device, ride control, height control and tracked type systems
Methods	Methods are to include: • functional testing, pressure testing, measurement • visual, aural and functional assessments (including damage, corrosion, leakage, wear) • adjustment of shock absorbers
WHS	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulations/codes of practice and workplace policies and practices
Safe operating procedures	Safe operating procedures are to include, but are not limited to the conduct of operational risk assessment and treatments associated with vehicular movement, hazardous substances, machinery movement and operation, manual lifting and shifting, working in proximity to others and site visitors
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to emergency shutdown and stopping of equipment, operating safely in the event of fires, enterprise first aid requirements and site evacuation
Environmental requirements	Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management
Quality requirements	Quality requirements are to include, but are not limited to regulations, including Australian

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RANGE STATEMENT	
	Standards, internal company quality policy and standards and enterprise operations and procedures
Statutory/regulatory authorities	Statutory/regulatory authorities may include Federal, State/Territory and local authorities administering acts, regulations and codes of practice
Tooling and equipment	Tooling and equipment may include hand tooling, lifting equipment, safety stands and supporting equipment, measuring equipment, power tooling and testing equipment
Materials	Materials may include spare parts, lubricants and fluids and cleaning materials
Communications	Communications are to include, but are not limited to verbal and visual instructions and fault reporting and may include site specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches • safe work procedures related to the inspection and servicing of suspension systems • regulatory/legislative requirements pertaining to the automotive industry, including Australian Design Rules • engineer's design specifications and instructions • organisation work specifications and requirements • instructions issued by authorised enterprise or external persons • Australian Standards

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Unit Sector(s)

Unit sector	Mechanical Miscellaneous

Co-requisite units

Not applicable.

Competency field

Competency field	Technical - Steering and Suspension

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AURTTJ2002 Remove and refit wheel hubs and associated brake components

Modification History

Release	Comment
Release 1	Replaces AURT217865A Remove and refit wheel hubs and associated brake components Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit covers the competence to remove and refit wheel hubs and associated brake components necessary during the rectification of faults in steering and suspension systems. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	The unit applies to all types of wheel hubs and brake systems fitted to light vehicles, including 4WD vehicles and light commercial vehicles. Work involves removing and refitting various brake system components necessary to carry out required rectification procedures for steering and suspension systems. Work requires individuals to demonstrate discretion, judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. **Prepare for work**	1.1. Nature and scope of work requirements are identified and confirmed 1.2. Information required for the work is accessed from manufacturer/component supplier specifications and interpreted 1.3. WHS policies and procedures are observed throughout the work processes 1.4. Components, tooling and equipment required for the work are identified, selected and prepared in accordance with site procedures 1.5. Wheel hub and brake components to be removed and refitted are identified and prepared in accordance

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ELEMENT	PERFORMANCE CRITERIA
	with manufacturer/component supplier and site procedures
2. **Remove wheel hubs and associated brake components**	2.1. System components are removed using hand tooling and specialist equipment without causing damage and are stored in an appropriate location 2.2. Identified component faults are reported to the customer and discussed for further instructions
3. **Refit and adjust wheel hubs and associated brake components**	3.1. Removed components are examined for serviceability prior to commencing the refitting procedures 3.2. Serviceable components are refitted according to manufacturer/component supplier specifications and instructions 3.3. Fluids and lubricants required during the refitting procedures are used in accordance with WHS and manufacturer/component supplier specifications 3.4. Refitted components are adjusted according to manufacturer/component supplier specifications
4. **Prepare wheel hub and brake components for use**	4.1. Work schedule documentation is completed 4.2. Final inspection is made to ensure work is to workplace expectations 4.3. Job card is processed in accordance with workplace procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• apply research and interpretive skills sufficient to locate, interpret and apply manufacturer/component supplier procedures, workplace policies and procedures • apply analytical skills required for identification and analysis of technical information • apply plain English literacy and communication skills in relation to dealing with customers and team members • apply questioning and active listening skills for example when obtaining information from customers • apply oral communication skills sufficient to convey information and concepts to

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REQUIRED SKILLS AND KNOWLEDGE
customers • apply planning and organising skills to own work activities, including making good use of time and resources, sorting out priorities and monitoring one's own performance • interact effectively with other persons both on a one-to-one basis and in groups, including understanding and responding to the needs of a customer and working effectively as a member of a team to achieve a shared goal • establish safe and effective work processes which anticipate and/or resolve problems and downtime, to systematically develop solutions to avoid or minimise reworking and avoid wastage • use mathematical ideas and techniques to correctly calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks • use workplace technology related to removal and refitting of wheel hubs and associated brake components, including the use of measuring equipment, specialist tooling, computerised technology, and communication devices and the reporting/documenting of results
Required knowledge
A working knowledge of: • WHS regulations/requirements, equipment, material and personal safety requirements • dangers of working with raised vehicles • principles of hydraulic brake system operation • brake bleeding methods • methods of using and applying lubricants and sealants • methods of fitting gaskets and circlips • types of wheel bearings and their adjustment methods • dismantling, assembling and adjusting procedures • types and layout of service/repair manuals (hard copy and electronic) • accessing/recording information from a computer

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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EVIDENCE GUIDE	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • conducting removal, replacement and tightening sequence and tensioning of wheel hub and brake components in accordance with workplace and manufacturer/component supplier requirements • completing work within workplace timeframes • wheel hub and brake components are presented to customer in compliance with workplace requirements
Context of, and specific resources for assessment	Application of competence is to be assessed in the workplace or simulated worksite Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints Assessment is to comply with regulatory requirements, including, Australian Standards The following resources should be made available: • workplace location or simulated workplace • material relevant to removal, fitting and adjustment of wheel hub and brake components • equipment, hand and power tooling appropriate to removal, fitting and adjustment of wheel hub and brake components • activities covering mandatory task requirements • specifications and work instructions
Method of assessment	Assessment must satisfy the endorsed assessment guidelines of the automotive industry's RS&R Training Package Assessment methods must confirm consistency and

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EVIDENCE GUIDE	
	accuracy of performance together with application of underpinning knowledge Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
System components	System components may include: • brake drums • brake shoes • disc brake calipers • wheel cylinders • disc pads • disc rotors

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RANGE STATEMENT	
	• wheel hubs • wheel bearings • ABS rotors and sensors
WHS	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulations/codes of practice and workplace policies and practices
Safe operating procedures	Safe operating procedures are to include, but are not limited to operational risk assessment and treatments associated with vehicular movement, toxic substances, electrical safety, machinery movement and operation, manual and mechanical lifting and shifting, working in proximity to others and site visitors
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation
Environmental requirements	Environmental requirements are to include, but are not limited to waste management, noise, dust and clean-up management
Quality requirements	Quality requirements are to include, but are not limited to regulations, including Australian Standards, internal company quality policy and standards and enterprise operations and procedures
Statutory/regulatory authorities	Statutory/regulatory authorities may include Federal, State/Territory and local authorities administering acts, regulations and codes of practice

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RANGE STATEMENT	
Tooling and equipment	Tooling and equipment may include: • hand and power tooling • lifting equipment and support stands • dial indicators • torque wrenches • brake spring removing tool • brake bleeding equipment • wheel bearing removing tools • wheel bearing grease • brake fluid
Communications	Communications are to include, but are not limited to verbal and visual instructions, and fault reporting and may include site specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches • safe work procedures related to the removal, fitting and adjustment of wheel hub and brake components • regulatory/legislative requirements pertaining to the automotive industry, including Australian Design Rules • engineer's design specifications and instructions • organisation work specifications and requirements • instructions issued by authorised enterprise or external persons • Australian Standards

Unit Sector(s)

Unit sector	Mechanical Miscellaneous

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Co-requisite units

Not applicable.

Competency field

Competency field	Technical - Wheels and Tyres

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AURTTY3001 Repair chassis, frame and associated components

Modification History

Release	Comment
Release 1	Replaces AURV328366A Repair chassis/frame and associated components Unit code updated to meet policy requirements Minor changes to unit title Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit covers the competence required to inspect/replace, repair and align chassis/frame and/or components applicable to vehicles with separate frame construction. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	The unit includes identification and confirmation of work requirement, preparation for work, the inspection, repair, replacement and alignment of chassis/frame and completion of work finalisation processes, including clean-up and documentation. Work requires individuals to demonstrate judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1. Work instructions are used to determine the job requirements, including method, materials and equipment. 1.2. Job specifications are read and interpreted. 1.3. WHS requirements, including dust and fume collection, breathing apparatus, eye and ear personal protection needs are observed throughout the work. 1.4. Material for repair is selected. 1.5. Equipment and tooling are identified and checked for safe and effective operation. 1.6. Procedures are determined to minimise waste material. 1.7. Procedures are identified for maximising energy efficiency while completing the job.

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ELEMENT	PERFORMANCE CRITERIA
2. Inspect to determine repairs	2.1. Information is accessed and interpreted from manufacturer/ component supplier specifications. 2.2. Written inspection report is prepared during inspection. 2.3. Inspection is completed without causing damage to any component or system. 2.4. Inspection activities are carried out according to industry regulations/guidelines, WHS legislation, and enterprise procedures/policies. 2.5. Results of inspection are documented/processed in accordance with enterprise requirements.
3. Replace or repair chassis/frame and associated components	3.1. Information is accessed and interpreted from manufacturer/ component supplier specifications. 3.2. Repair and replacement of chassis/frame and associated components are carried out in accordance with vehicle manufacturer/component supplier specifications and tolerances relative to the vehicle. 3.3. Replacement and repairs to components are achieved without causing damage to any component or system. 3.4. Workplace documentation is completed and dealt with relevant to replacement or repair outcomes. 3.5. All repair activities are carried out according to industry regulations/guidelines, WHS legislation, and enterprise procedures/policies.
4. Align chassis/frame components	4.1. Information is accessed and interpreted from manufacturer/ component supplier specifications. 4.2. Alignment of chassis/frame and associated components is carried out in accordance with vehicle manufacturer/ component supplier specifications and tolerances relative to the vehicle. 4.3. Alignment is achieved without causing damage to any component or system. 4.4. Workplace documentation is completed and dealt with relevant to chassis alignment outcomes. 4.5. All repair activities are carried out according to industry regulations/guidelines, WHS legislation, and enterprise procedures/policies.
5. Clear up work area and maintain equipment	5.1. Material that can be reused is collected and stored. 5.2. Waste and scrap is removed following workplace and environmental procedure. 5.3. Equipment and work area are cleaned and inspected

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ELEMENT	PERFORMANCE CRITERIA
	for serviceable condition in accordance with workplace procedures. 5.4. Unserviceable equipment is tagged and faults identified in accordance with workplace requirements. 5.5. Operator maintenance is completed in accordance with manufacturer/component supplier specifications and worksite procedures. 5.6. Tooling is maintained in accordance with workplace procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- collect, organise and understand information related to work orders, plans and safety procedures for repair of chassis/frame and associated components
- communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with worksite supervisor, other workers and customers, and the reporting of work outcomes and problems
- plan and organise activities, including preparation and layout of worksite and obtaining of equipment and materials to avoid backtracking, workflow interruptions or wastage
- work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity
- establish safe and effective work processes which anticipate and/or resolve problems and downtime, to systematically develop solutions to avoid or minimise reworking and avoid wastage
- use mathematical ideas and techniques to calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks
- use workplace technology related to repair of chassis/frame and associated components, including the use of specialist tooling and equipment, measuring equipment, computerised technology and communication devices and the reporting/recording of results

Required knowledge

A working knowledge of:

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REQUIRED SKILLS AND KNOWLEDGE
• WHS regulations/requirements, equipment, material and personal safety requirements • manufacturer/component supplier/company policies • technical information • inspection and measuring procedures • repair/replacement procedures • alignment procedures • welding techniques • manual handling techniques • work organisation and planning processes • enterprise quality processes

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • inspecting, replacing/repairing and aligning of a range of chassis/frame components to workplace and manufacturer/component supplier requirements • completing workplace/equipment documentation.
Context of, and specific resources for assessment	Application of competence is to be assessed in the workplace or simulated worksite. Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints. Assessment is to comply with regulatory requirements,

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EVIDENCE GUIDE	
	including Australian Standards. The following resources should be made available: • workplace location or simulated workplace • materials relevant to repair of chassis/frame and associated components • equipment, hand and power tooling appropriate to repair of chassis/frame and associated components • activities covering mandatory task requirements • specifications and work instructions.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the automotive industry's RS&R Training Package. • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. • Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies. • Assessment may be applied under project related conditions and require evidence of process. • Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements. • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential

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RANGE STATEMENT	
operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Chassis/frame and associated components	Chassis/frame and associated components include chassis, body, wheels, body panels, accessories and body frames.
Repair methods	Repair methods are to include: • visual, aural and functional assessments (including damage, wear and breakage) • application of the principles, angles and geometry of vehicle wheel and chassis alignment • measuring • welding and framing.
WHS	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of materials, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances.
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulation/codes of practice and workplace policies and practices.
Safe operating procedures	Safe operating procedures are to include, but are not limited to operational risk assessment and treatments associated with vehicular movement, toxic substances, electrical safety, machinery movement and operation, manual and mechanical lifting and shifting, working in proximity to others and worksite visitors.
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and worksite evacuation.
Environmental requirements	Environmental requirements are to include but are

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RANGE STATEMENT	
	not limited to waste management, noise, dust and clean-up management.
Quality requirements	Quality requirements are to include, but are not limited to regulations, including Australian Standards, internal company quality policy and standards and enterprise operations and procedures.
Statutory/regulatory authorities	Statutory/regulatory authorities may include Federal, State/Territory and local authorities administering acts, regulations and codes of practice.
Tooling and equipment	Tooling and equipment may include hand tooling, power tooling, measuring equipment, pressing equipment, heating equipment, welding equipment which may include arc, oxy acetylene, MIG, TIG, chassis aligning equipment, specialist tooling for removal/alignment, lifting equipment and wheel alignment equipment.
Materials	Materials may include welding consumables, spare parts and cleaning materials.
Communications	Communications are to include, but are not limited to verbal and visual instructions and fault reporting and may include worksite specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers.
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches • safe work procedures related to repair of chassis/frame and associated components • regulatory/legislative requirements pertaining to automotive industry, including Australian Design Rules • engineer's design specifications and instructions • organisation work specifications and

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RANGE STATEMENT	
	requirements • instructions issued by authorised enterprise or external persons • Australian Standards.

Unit Sector(s)

Unit sector	Mechanical Miscellaneous

Co-requisite units

Not applicable.

Competency field

Competency field	Technical - Chassis and Frame

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AURV365356A Read and interpret vehicle body repair estimation/quotation

Modification History

Unit Descriptor

This unit identifies the competence required to read and interpret a vehicle body repair estimation/quotation and determine work requirements, repair procedures, timelines and replacement part inventory.

This unit identifies the competence required to read and interpret a vehicle body repair estimation/quotation and determine work requirements, repair procedures, timelines and replacement part inventory.

Application of the Unit

Licensing/Regulatory Information

Pre-Requisites

Employability Skills Information

Elements and Performance Criteria Pre-Content

Elements define essential outcomes of a unit of competence

Performance criteria specify the level of performance required to demonstrate achievement of the element

Elements define essential outcomes of a unit of competence

Performance criteria specify the level of performance required to demonstrate achievement of the element

Elements and Performance Criteria

Elements and Performance Criteria

Element	Performance Criteria
1 Read and interpret vehicle body repair quotation	1.1 Products/systems/components/items represented are identified

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		1.2 Information presented is interpreted
2	Identify job requirements	2.1 Specialised work activities and sub contracting requirements are identified
		2.2 Replacement part requirements are identified and supply source identified
		2.3 Repair processes are identified and resource requirements determined
		2.4 Repair timeframe is estimated
		2.5 Job requirements are documented
3	Determine and record body repair procedures	3.1 Pre-repair operations are identified and documented
		3.2 Body repair procedures are identified and include: stages within the repair procedure repair, removal and replacement tasks estimated timing relating to part/component purchase and delivery subletting requirements, including access and timeframes additional specialist and material requirements
		3.3 Assistance is to be sought from persons where repair quotation is not able to be fully interpreted
		3.4 Repair requirements are documented according to enterprise requirements and industry recommended codes of practice
		3.5 Determined repair procedures take into account requirements relating to industry regulations/guidelines, OH&S legislation, and enterprise policy and procedures

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Required Skills and Knowledge

Evidence Guide

The Evidence guide identifies critical aspects, knowledge and skills to be demonstrated to confirm competence for this unit. This is an integral part of the assessment of competence and should be read in conjunction with the Range Statement.

Critical aspects of evidence	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: observing safety procedures and requirements communicating effectively with others involved in or affected by the work selecting methods and techniques appropriate to the circumstances completing preparatory activity in a systematic manner
Critical aspects of evidence (continued)	accurately interpreting vehicle body repair quotation determining repair requirements, including repair procedures, component/part purchases and sublet work requirements estimating repair timelines
Relationship to other units	Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role
Underpinning knowledge	A working knowledge of: OH&S regulations/requirements, equipment, material and personal safety requirements reading and interpretation skills vehicle body repair estimate/quotation

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	methods planning and work coordination procedures work activity timeframe estimation procedures vehicle body repair methods and procedures work organisation and planning processes enterprise quality processes
Specific key competencies, **underpinning and employability skills required to achieve the performance criteria**	These include a number of processes that are learned throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies, although others may be added. The details below highlight how these competencies are to be applied in the attainment of this unit. Application of the key competencies in this unit are to satisfy the nominated level in which: Level 1 - relates to working effectively within set conditions and processes; Level 2 - relates to management or facilitation of conditions or processes; and Level 3 - relates to design, development and evaluation of conditions or process. How will the candidate apply the following key competency in this unit? The candidate will need to:
Collect, analyse and organise information	Collect, organise and understand information related to work orders, plans and safety procedures for reading and interpreting vehicle body repair estimation/quotations (Level 2)
Communicate ideas and information	Communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with worksite supervisor, other workers and customers, and the reporting of work outcomes and problems

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	(Level 1)
Plan and organise activities	Plan and organise activities, including preparation and layout of worksite and obtaining of equipment and materials to avoid backtracking, workflow interruptions or wastage (Level 1)
Work with others and in a team	Work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity (Level 1)
Solve problems	Establish safe and effective work processes which anticipate and/or resolve problems and downtime, to systematically develop solutions to avoid or minimise reworking and avoid wastage (Level 1)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks (Level 1)
Use technology	Use workplace technology related to interpreting and using repair quotations, including the use of measuring equipment, computerised technology and communication devices and the reporting/recording of results (Level 1)
Context of assessment	Application of competence is to be assessed in the workplace or simulated worksite Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints Assessment is to comply with regulatory requirements, including Australian Standards

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Method of assessment	Assessment must satisfy the endorsed assessment guidelines of the automotive industry's RS&R Training Package Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies Assessment may be applied under project related conditions and require evidence of process Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements
Specific resource requirements for this unit	The following resources should be made available: workplace location or simulated workplace materials relevant to interpreting and using repair quotations equipment and tooling appropriate to interpreting and using repair quotations activities covering mandatory task requirements specifications and work instructions

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Range Statement

The Range Statement provides advice to interpret the scope and context of this unit of competence, allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Unit scope	Methods are to include: reading and interpreting repair quotation consultation with customer/qualified persons determining repair requirements, including repair procedures, component/part purchases and sublet work requirements estimating repair timelines accurate recording of repair procedures
Unit context	Work requires individuals to demonstrate discretion, judgement and problem-solving skills in managing own work activities and contributing to a productive team environment Work is carried out in accordance with award provisions
Safety (**OH**&**S**)	OH&S requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, handling of materials, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances Personal protective equipment is to include that prescribed under legislation/regulation/codes of practice and workplace policies and practices Emergency procedures related to this unit are to include, but are not limited to extinguishing fires, enterprise first aid requirements and worksite evacuation
Environmental requirements	Environmental requirements are to include but are not limited to clean-up management

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Quality requirements	Quality requirements are to include, but are not limited to regulations, including Australian Standards, internal company quality policy and standards and enterprise operations and procedures
Statutory/regulatory authorities	Statutory/regulatory authorities may include Federal, State/Territory and local authorities administering acts, regulations and codes of practice
Tooling and equipment	Tooling and equipment may include computer software/ hardware, general office equipment, communication equipment
Communications	Communications are to include, but are not limited to verbal and visual instructions and fault reporting and may include worksite specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers
Information	Information sources may include, but are not limited to verbal or written and graphical instructions, work bulletins, memos, material safety data sheets, diagrams or sketches Regulatory/legislative requirements pertaining to automotive industry, including Australian Design Rules Organisation work specifications and requirements Instructions issued by authorised enterprise or external persons

Unit Sector(s)

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AURVTG3011 Install side windows

Modification History

Release	Comment
Release 1	Replaces AURV334031A Install side windows Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit covers the competence required to fabricate templates, mark out and cut panels, prepare cut edges and install side windows. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	The unit includes identification and confirmation of work requirement, preparation for work, fabrication and use of templates, marking out and cutting of panels/trim, preparation of cut edges, installation of windows and completion of work finalisation processes, including clean-up and documentation. Work requires individuals to demonstrate judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1. Work instructions are used to determine job requirements, including method, materials and equipment. 1.2. Job specifications are read and interpreted. 1.3. WHS requirements, including dust and fume collection, breathing apparatus and eye and ear personal protection needs are observed throughout the work. 1.4. Material for installation is selected. 1.5. Equipment and tooling are identified and checked for safe and effective operation. 1.6. Procedures are determined to minimise waste material. 1.7. Procedures are identified for maximising energy efficiency while completing the job.
2. Measure, mark out and fabricate template	2.1. Information is accessed and interpreted from manufacturer/ component supplier specifications. 2.2. Suitable materials are selected and template is

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ELEMENT	PERFORMANCE CRITERIA
	fabricated to shape and size. 2.3. Templates are completed without causing damage to any component or system. 2.4. Fabricating and measuring activities are carried out according to industry regulations/guidelines, WHS legislation, and enterprise procedures/policies.
3. Mark out, cut panels/trim and prepare cut edges	3.1. Information is accessed and interpreted from manufacturer/ component supplier specifications. 3.2. Template is used to mark out areas to be cut. 3.3. Panels/trim are cut using approved methods and equipment in accordance with specifications. 3.4. Panels/trim are prepared in readiness for installing window. 3.5. Panels are reinforced to comply with manufacturer/ component supplier requirements. 3.6. Work is completed without causing damage to any component or system. 3.7. Marking out, cutting and preparation activities are carried out according to industry regulations/guidelines, WHS legislation, and enterprise procedures/policies.
4. Install window	4.1. Information is accessed and interpreted from manufacturer/ component supplier specifications. 4.2. Window is installed to specification. 4.3. Installed window is checked for operation and leak tested. 4.4. Installation is achieved without causing damage to any component or system. 4.5. All installation and checking is performed according to industry regulations/guidelines, WHS legislation, and enterprise procedures/policies.
5. Clean up work area and maintain equipment	5.1. Material that can be reused is collected and stored. 5.2. Waste and scrap are removed following workplace and environmental procedures. 5.3. Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures. 5.4. Unserviceable equipment is tagged and faults identified in accordance with workplace requirements. 5.5. Operator maintenance is completed in accordance

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ELEMENT	PERFORMANCE CRITERIA
	with manufacturer/component supplier specifications and worksite procedures. 5.6. Tooling is maintained in accordance with workplace procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• collect, organise and understand information related to work orders, plans and safety procedures for installing windows • communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with worksite supervisor, other workers and customers, and the reporting of work outcomes and problems • plan and organise activities, including preparation and layout of worksite and obtaining of equipment and materials to avoid backtracking, workflow interruptions or wastage • work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity • establish safe and effective work processes which anticipate and/or resolve problems and downtime, to systematically develop solutions to avoid or minimise reworking and avoid wastage • use mathematical ideas and techniques to calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks • use workplace technology related to installation of side windows, including the use of specialist tooling, measuring equipment and communication devices and the reporting/ recording of results
Required knowledge
A working knowledge of: • WHS regulations/requirements, equipment, material and personal safety requirements • enterprise/manufacturer/component supplier policies • technical information • marking out procedures • measuring procedures

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REQUIRED SKILLS AND KNOWLEDGE
• cutting procedures (panels and trim) • window installation procedures • panel reinforcing methods • work organisation and planning processes • enterprise quality processes

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • applying vehicle protection methods • preparing and installing a range of side windows with a minimum of one requiring panel reinforcement • completing workplace records.
Context of, and specific resources for assessment	Application of competence is to be assessed in the workplace or simulated worksite. Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints. Assessment is to comply with regulatory requirements, including Australian Standards. The following resources should be made available: • workplace location or simulated workplace • materials relevant to installation of side windows • equipment, hand and power tooling appropriate to

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EVIDENCE GUIDE	
	installation of side windows • activities covering mandatory task requirements • specifications and work instructions.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the automotive industry's RS&R Training Package. • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. • Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies. • Assessment may be applied under project related conditions and require evidence of process. • Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements. • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Installation methods	Installation methods are to include measuring, marking out, cutting, preparing cut edges, reinforcing cut panels, installing side windows, leak testing installed side window and sealing, testing operation and cleaning.
Side windows	Side windows may be installed in vehicles, trailers, outdoor equipment, caravans, agricultural equipment and recreational boating.
WHS	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of materials, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances.
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulation/codes of practice and workplace policies and practices.
Safe operating procedures	Safe operating procedures are to include, but are not limited to operational risk assessment and treatments associated with vehicular movement, toxic substances, electrical safety, machinery movement and operation, manual and mechanical lifting and shifting, working in proximity to others and worksite visitors.
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and worksite evacuation.
Environmental requirements	Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management.
Quality requirements	Quality requirements are to include, but are not limited to regulations, including Australian Standards, internal company quality policy and standards and enterprise operations and

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RANGE STATEMENT	
	procedures.
Statutory/regulatory authorities	Statutory/regulatory authorities may include Federal, State/Territory and local authorities administering acts, regulations and codes of practice.
Tooling and equipment	Tooling and equipment may include hand tooling, power tooling, measuring equipment, marking out equipment, cutting equipment, vehicle protection equipment and templates.
Materials	Materials may include template materials, rubber sections, adhesives and cleaning materials.
Communications	Communications are to include, but are not limited to verbal and visual instructions and fault reporting and may include worksite specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers.
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches • safe work procedures related to installation of side windows • regulatory/legislative requirements pertaining to working with glass • engineer's design specifications and instructions • organisation work specifications and requirements • instructions issued by authorised enterprise or external persons • Australian Standards.

Unit Sector(s)

Unit sector	Vehicle body

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Co-requisite units

Not applicable.

Competency field

Competency field	Technical - Glazing

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AURVTN2005 Remove and fit protector mouldings, transfers and decals

Modification History

Release	Comment
Release 1	Replaces AURV226965A Remove and replace/fit protector mouldings, transfers and decals Unit code updated to meet policy requirements Minor changes to unit title Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the skills and knowledge required to remove and replace/fit protector mouldings, transfers and decals. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	The unit includes identification and confirmation of work requirements, preparation for work, removal, replacement and refitting of protector mouldings, transfers and decals, and completion of work finalisation processes, including clean-up and documentation. Work requires individuals to demonstrate judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1. Work instructions are used to determine job requirements, including method, material and equipment. 1.2. Job specifications are read and interpreted. 1.3. Workplace health and safety (WHS) requirements, including personal protection needs are observed throughout the work. 1.4. Material for the work is selected. 1.5. Equipment and tooling are identified and checked for safe and effective operation. 1.6. Procedures are determined to minimise waste material. 1.7. Procedures are identified for maximising energy efficiency while completing the job.

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ELEMENT	PERFORMANCE CRITERIA
2. Remove protector mouldings, transfers and decals	2.1. Information is accessed and interpreted from manufacturer/component supplier specifications. 2.2. Work is completed without causing damage to component, system or protector mouldings, transfers and decals. 2.3. Removal activities are carried out according to industry regulations/guidelines, WHS requirements, legislation and enterprise procedures/policies.
3. Prepare for replacement/ fitting of protector mouldings, transfers and decals	3.1. Information is accessed and interpreted from manufacturer/ component supplier specifications. 3.2. Protector mouldings, transfers and decals to be fitted are within specifications for dimensions, material and functional capability. 3.3. Adhesives are selected according to the product manufacturer/component supplier specification for type, method, application and thickness. 3.4. Work is completed without causing damage to component, system or protector mouldings or transfers and decals. 3.5. Reusable moulds, decals and attachment clips/components are inspected and cleaned in preparation for refitting.
4. Replace/fit protector mouldings, transfers and decals	4.1. Information is accessed and interpreted from manufacturer/component supplier specifications. 4.2. Protector mouldings, transfers and decals are replaced and fitted using approved methods, material and equipment. 4.3. Adhesives are applied according to the product manufacturer/component supplier specifications for type, method, application and thickness. 4.4. Work is completed without causing damage to component, system or protector mouldings, transfers and decals. 4.5. Replacement/refitting activities are carried out according to industry regulations/guidelines, WHS requirements, legislation and enterprise procedures/policies.
5. Clean up work area and maintain equipment	5.1. Material that can be reused is collected and stored 5.2. Waste and scrap is removed following workplace and environmental procedures. 5.3. Equipment and work area are cleaned and inspected for serviceable condition in accordance with

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ELEMENT	PERFORMANCE CRITERIA
	workplace procedures. 5.4. Unserviceable equipment is tagged and faults identified in accordance with workplace requirements. 5.5. Operator maintenance is completed in accordance with manufacturer/component supplier specifications and worksite procedures. 5.6. Tooling is maintained in accordance with workplace procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- collect, organise and understand information related to work orders, plans and safety procedures for removing and replacing/fitting protector mouldings, transfers and decals
- communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with worksite supervisor, other workers and customers, and reporting of work outcomes and problems
- plan and organise activities, including preparation and layout of worksite and obtaining of equipment and material to avoid backtracking, workflow interruptions or wastage
- work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity
- establish safe and effective work processes which anticipate and/or resolve problems and downtime, to systematically develop solutions to avoid or minimise reworking and wastage
- use mathematical ideas and techniques to calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks
- use workplace technology related to removal and replacement/ refitting of protector mouldings, transfers and decals, including use of specialist tooling, measuring equipment and communication devices and the reporting/documenting of results

Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge includes: • WHS regulations/requirements, equipment, material and personal safety requirements • types of mouldings, transfers and decals • methods for fitting mouldings, transfers and decals • fastening methods (adhesives and mechanical methods) • use of tooling and equipment • removal procedures • replacement/fitting procedures and preparation • work organisation and planning processes • enterprise quality processes

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • completing removal and replacement operations covering a minimum of three components, including: • a double-sided tape moulding, and • an anti-scruff or door frame tape • replacing/refitting protector mouldings, transfers and decals.
Context of, and specific resources for assessment	• The following resources should be made available: • workplace location or simulated workplace • material relevant to the removal and

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EVIDENCE GUIDE	
	replacement/fitting of protector mouldings, transfers and decals • equipment, hand and power tooling appropriate to the removal and replacement/fitting of protector mouldings, transfers and decals • activities covering mandatory task requirements • specifications and work instructions.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Automotive Industry Retail, Service and Repair Training Package. • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. • Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies. • Assessment may be applied under project-related conditions and require evidence of process. • Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements. • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold

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RANGE STATEMENT	
italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Specific requirements	Specific requirements are to: • remove, replace/fit protector mouldings, transfers and decals, including door frame decals and anti-scuff protectors
Methods	Methods are to include: • adhesive bonding and mechanical fastening
WHS	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include: • protective clothing and equipment • use of tooling and equipment • workplace environment and safety • handling of material • use of firefighting equipment • enterprise first aid • hazard control and hazardous material and substances
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulation/codes of practice and workplace policies and practices
Safe operating procedures	Safe operating procedures are to include, but are not limited to: • operational risk assessment and treatments associated with vehicular movement, toxic substances, electrical safety, machinery movement and operation, manual and mechanical lifting and shifting, working in proximity to others and worksite visitors
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to: • emergency shutdown and stopping of equipment • extinguishing fires

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RANGE STATEMENT	
	• enterprise first aid requirements • worksite evacuation
Environmental requirements	Environmental requirements are to include, but are not limited to: • waste management, noise, dust and clean-up management
Quality requirements	Quality requirements are to include, but are not limited to: • regulations, including Australian standards • internal company quality policies and standards • enterprise operations and procedures
Statutory/regulatory authorities	Statutory/regulatory authorities may include: • federal, state/territory and local authorities administering Acts, regulations and codes of practice
Tooling and equipment	Tooling and equipment may include: • hand tooling, adhesive equipment, measuring equipment and specialist tooling for removal
Materials	Materials may include: • adhesives and cleaning materials
Communications	Communications are to include, but are not limited to: • verbal and visual instructions and fault reporting and may include worksite specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets (MSDS), diagrams or sketches • safe work procedures related to the removal and replacement/refitting of protector mouldings, transfers and decals • regulatory/legislative requirements pertaining to automotive industry, including Australian

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RANGE STATEMENT	
	Design Rules • engineer's design specifications and instructions • organisation work specifications and requirements • instructions issued by authorised enterprise or external persons • Australian standards

Unit Sector(s)

Unit sector	Vehicle body

Co-requisite units

Not applicable.

Competency field

Competency field	Technical - Body

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AURVTN4032 Determine vehicle damage and recommended repair procedures

Modification History

Release	Comment
Release 1	Replaces AURV465116A Determine vehicle damage and recommended repair procedures Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit identifies the competence required to inspect a vehicle for damage and recommend repair action. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	The unit includes identification and confirmation of work requirement, preparation for work, inspection, determination of repair requirements, preparation of a written report, including repair recommendations and completion of work finalisation processes, including clean-up and documentation. Work requires individuals to demonstrate judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1. Work instructions are used to determine the job requirements, including job sheets and inspection procedures. 1.2. Job specifications are read and interpreted. 1.3. WHS requirements, including personal protection needs, are observed throughout the work. 1.4. Vehicle to be inspected is identified. 1.5. Procedures are determined to minimise inspection time.
2. Inspect vehicle to determine cause and extent of damage	2.1. Inspection is carried out according to industry regulations/ guidelines, WHS legislation, and enterprise procedures/ policies. 2.2. Repair methods that conform to vehicle manufacturer/ component supplier, insurance

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ELEMENT	PERFORMANCE CRITERIA
	company, enterprise and statutory guidelines are identified and recommended. 2.3. Inspection is completed without causing damage to workplace, property or vehicle.
3. Prepare a written damage repair report	3.1. Written damage inspection report is prepared with sufficient information to enable preparation of repair quotation, including repair options. 3.2. Damage inspection report is appropriate to type of damage sustained. 3.3. Damage report refers to repair requirements identified, including in-house and sublet requirements. 3.4. Damage report is prepared and presented according to industry and enterprise guidelines/requirements.
4. Clean up work area and maintain equipment	4.1. Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures. 4.2. Unserviceable equipment is tagged and faults identified in accordance with workplace procedures. 4.3. Operator maintenance is completed in accordance with manufacturer/component supplier specifications and worksite procedures. 4.4. Tooling is maintained in accordance with workplace procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• collect, organise and understand information related to work orders, plans and safety procedures for determining vehicle damage and recommending repair procedures • communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with worksite supervisor, other workers and customers, and the reporting of work outcomes and problems • plan and organise activities, including preparation and layout of worksite and obtaining of equipment and materials to avoid backtracking, workflow

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REQUIRED SKILLS AND KNOWLEDGE
interruptions or wastage • work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity • use mathematical ideas and techniques to complete tests, measurements and assessment of unit/component serviceability required for the work • use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and components) • use workplace technology related to recommending repair procedures, including the use of measuring equipment, computerised technology and communication devices and the reporting/recording of results
Required knowledge
A working knowledge of: • WHS regulations/requirements, equipment, material and personal safety requirements • industry records and how to maintain them • written communications and report writing • vehicle inspection, damage assessment and test procedures • vehicle inspection procedures • industry standards • work organisation and planning processes • enterprise quality processes.

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the

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EVIDENCE GUIDE	
	circumstances • completing preparatory activity in a systematic manner • for a range of vehicles: • assessing damage accurately without damage or injury to tooling, equipment and persons • recommending repair action • preparing a written repair report.
Context of, and specific resources for assessment	Application of competence is to be assessed in the workplace or simulated worksite, Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints, Assessment is to comply with regulatory requirements, including Australian Standards. The following resources should be made available: • workplace location or simulated workplace • materials relevant to vehicle inspection procedures • equipment, hand and power tooling appropriate to vehicle inspection procedures • activities covering mandatory task requirements • specifications and work instructions.
Method of assessment	Assessment must satisfy the endorsed assessment guidelines of the automotive industry's RS&R Training Package, Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge, Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies, Assessment may be applied under project related conditions and require evidence of process, Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances, It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements,

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EVIDENCE GUIDE	
	Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role,
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Methods	Methods are to include: • inspection • measurement • partial dismantling • completion of written report.
WHS	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of materials, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances.
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulation/codes of practice and workplace policies and practices.
Safe operating procedures	Safe operating procedures are to include, but are not limited to operational risk assessment and treatments associated with vehicular movement, toxic substances, electrical safety, machinery

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RANGE STATEMENT	
	movement and operation, manual and mechanical lifting and shifting, working in proximity to others and worksite visitors.
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and worksite evacuation.
Environmental requirements	Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management.
Quality requirements	Quality requirements are to include, but are not limited to regulations, including Australian Standards, internal company quality policy and standards and enterprise operations and procedures.
Statutory/regulatory authorities	Statutory/regulatory authorities may include Federal, State/Territory and local authorities administering acts, regulations and codes of practice.
Communications	Communications are to include, but are not limited to verbal and visual instructions and fault reporting and may include worksite specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers.
Information/documents	Sources of information/documents may include: • vehicle manufacturer/component supplier specifications, written enterprise procedures, insurance company reports, product manufacturer/component supplier specifications and customer report. • safe work procedures related to vehicle inspection procedures. • regulatory/legislative requirements pertaining to automotive industry, including Australian Design Rules. • engineer's design specifications and instructions. • organisation work specifications and

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RANGE STATEMENT	
	requirements. • instructions issued by authorised enterprise or external persons. • Australian Standards.

Unit Sector(s)

Unit sector	Vehicle Body

Co-requisite units

Not applicable.

Competency field

Competency field	Technical - Body

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AURVTP2007 Apply paint touch-up techniques

Modification History

Release	Comment
Release 1	Replaces AURV230449A Apply paint touch-up techniques Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit of competency covers the skills and knowledge required to prepare equipment and apply materials for paint touch-up or minor repairs. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	The unit includes identification and confirmation of work requirements, preparation for work, preparation of equipment for application of material for paint touch-up, and completion of work finalisation processes, including clean-up and documentation. Work requires individuals to demonstrate judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1. Work instructions are used to determine job requirements, including method and material type. 1.2. Job specifications are read and interpreted. 1.3. Workplace health and safety (WHS) requirements, including personal protection needs, are observed throughout the work. 1.4. Materials are selected and inspected for quality. 1.5. Hand, power tooling and safety equipment are identified and checked for operation. 1.6. Procedures are determined to minimise waste material. 1.7. Procedures are identified for maximising energy efficiency while completing the job.
2. Prepare equipment	2.1. Information is accessed and interpreted from manufacturer/ component supplier specifications. 2.2. Preparation is carried out according to industry regulations/guidelines, WHS requirements, legislation and enterprise procedures/policies.

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ELEMENT	PERFORMANCE CRITERIA
3. Prepare and apply materials	3.1. Information is accessed and interpreted from manufacturer/ component supplier specifications. 3.2. Preparation and application of materials is carried out in accordance with manufacturer/component supplier specifications. 3.3. Preparation and application of materials is carried out according to industry regulations/guidelines, WHS requirements, legislation and enterprise procedures/ policies.
4. Clean up work area and maintain equipment	4.1. Material that can be reused is collected and stored. 4.2. Waste and scrap is removed following workplace procedure. 4.3. Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures. 4.4. Unserviceable equipment is tagged and faults identified in accordance with workplace procedures. 4.5. Operator maintenance is completed in accordance with manufacturer/component supplier specifications and worksite procedures. 4.6. Tooling is maintained in accordance with workplace procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • collect, organise and understand information related to work orders, plans and safety procedures for the preparation and use of equipment and material for paint touch-up techniques • communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with worksite supervisor, other workers and customers, and the reporting of work outcomes and problems • plan and organise activities, including preparation and layout of worksite and obtaining of equipment and material to avoid backtracking, workflow interruptions or wastage

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REQUIRED SKILLS AND KNOWLEDGE
• work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity • use mathematical ideas and techniques to use equipment and mix material required for the work • establish safe and effective work processes which anticipate and/or resolve problems and downtime, to systematically develop solutions to avoid or minimise reworking and wastage • use workplace technology related to the preparation and use of equipment and material for paint touch-up techniques, including the use of specialised tooling and equipment, measuring equipment and communication devices and the reporting/documenting of results
Required knowledge
Required knowledge includes: • WHS regulations/requirements, equipment, material and personal safety requirements • environmental protection requirements/material disposal and storage • material safety data sheets • industry code of practice • the types, applications and preparation processes for paints • paint mixing procedures • spraying equipment procedures • equipment/material safety requirements • hand painting procedures, including rolling • application procedures • work organisation and planning processes • enterprise quality procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and

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EVIDENCE GUIDE	
unit	to respond to unusual situations in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • preparing a range of equipment • preparing a range of materials • the completion of touch-up painting for a range of circumstances, including the use of spray equipment and brushes • applying a range of touch-up materials.

Context of, and specific resources for assessment	• Application of competence is to be assessed in the workplace or simulated worksite.
	• Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints.
	• Assessment is to comply with regulatory requirements, including Australian standards.
	• The following resources should be made available:
	  • workplace location or simulated workplace
	  • material relevant to the preparation and use of equipment and material for paint touch-up techniques
	  • equipment, hand and power tooling appropriate to the preparation and use of equipment and material for paint touch-up techniques
	  • activities covering mandatory task requirements
	  • specifications and work instructions.

Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the Automotive Industry Retail, Service and Repair Training Package. • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. • Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies. • Assessment may be applied under project-related conditions and require evidence of process. • Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the

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EVIDENCE GUIDE	
	particular circumstance, but is able to be transferred to other circumstances. • It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements. • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Application systems and equipment	Application systems and equipment are to include: • spray gun techniques • drying techniques • paint mixing • paint rolling • paint straining • paint thinning • paint matching • buffing and polishing
Materials	Materials are to include: • oil-based paints • water-based paints • synthetic paints • vinyl paints, • undercoats • lacquers

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RANGE STATEMENT	
	• enamels • paint thinners and paint reducers
WHS	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include: • protective clothing and equipment • use of tooling and equipment • workplace environment and safety • handling of material • use of firefighting equipment • enterprise first aid • hazard control and hazardous material and substances
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulation/codes of practice and workplace policies and practices
Safe operating procedures	Safe operating procedures are to include, but are not limited to: • operational risk assessment and treatments associated with toxic substances, electrical safety, machinery movement and operation, manual and mechanical lifting and shifting, working in proximity to others and worksite visitors
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to: • emergency shutdown and stopping of equipment • extinguishing fires • enterprise first aid requirements • worksite evacuation
Environmental requirements	Environmental requirements are to include, but are not limited to: • waste management, noise, dust and clean-up management
Quality requirements	Quality requirements are to include, but are not limited to:

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RANGE STATEMENT	
	• regulations, including Australian Standards • internal company quality policy and standards • enterprise operations and procedures
Statutory/regulatory authorities	Statutory/regulatory authorities may include: • federal, state/territory and local authorities administering Acts, regulations and codes of practice
Tooling and equipment	Tooling and equipment may include: • spray guns • air pressure regulators • air compressors • personal protective equipment • spray booths • heating and lighting systems • safety equipment • mixing equipment • paint stirring equipment • paint straining and thinning equipment • paint pots • machine buffs and polishes
Materials	Materials may include: • paint, thinners and cleaning materials
Communications	Communications are to include, but are not limited to: • verbal and visual instructions and fault reporting and may include worksite specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets (MSDS), diagrams or sketches • safe work procedures related to the preparation and use of equipment and material for paint touch-up techniques • regulatory/legislative requirements pertaining

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RANGE STATEMENT	
	to automotive painting and finishing • engineer's design specifications and instructions • organisation work specifications and requirements • instructions issued by authorised enterprise or external persons • Australian standards

Unit Sector(s)

Unit sector	Vehicle body

Co-requisite units

Not applicable.

Competency field

Competency field	Technical - Paint

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AURVTS3004 Repair fibreglass and composite material components

Modification History

Release	Comment
Release 1	Replaces AURV324866A Repair fibreglass and composite material components Unit code updated to meet policy requirements Minor changes to unit title Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit covers the competence required to repair components on vehicle bodies using composite materials. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	The unit includes identification and confirmation of work requirement, preparation for work, repair and checking of components and completion of work finalisation processes, including clean-up and documentation. Work requires individuals to demonstrate judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1. Work instructions are used to determine the job requirements, including job sheets, quality and quantity of materials. 1.2. Job specifications are read and interpreted. 1.3. WHS requirements, including personal protection needs, are observed throughout the work. 1.4. Materials are selected and inspected for quality. 1.5. Hand, power tooling and safety equipment are identified and checked for safe use. 1.6. Procedures are determined to minimise waste material. 1.7. Procedures are identified for maximising energy efficiency while completing the job.
2. Carry out repair procedures	2.1. Information is accessed and interpreted from manufacturer/component supplier specifications. 2.2. Items to be repaired are identified.

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Methods of repair are identified. 2.4. Equipment, tooling and materials are prepared for use. 2.5. Repair procedures are carried out following enterprise procedures. 2.6. Repair procedures are completed without causing damage to equipment or machinery. 2.7. All activities are carried out according to industry regulations/guidelines, WHS legislation, and enterprise procedures/policies. 2.8. Repairs are checked to specification and workplace/ equipment records are completed to worksite requirements.
3. Clean up work area and maintain equipment	3.1. Material that can be reused is collected and stored. 3.2. Waste and scrap is removed following workplace procedure. 3.3. Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures. 3.4. Unserviceable equipment is tagged and faults identified in accordance with workplace procedures. 3.5. Operator maintenance is completed in accordance with manufacturer/component supplier specifications and worksite procedures. 3.6. Tooling is maintained in accordance with workplace procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• apply research and interpretive skills sufficient to locate, interpret and apply manufacturer/component supplier procedures, workplace policies and procedures • apply analytical skills required for identification and analysis of technical information • apply plain English literacy and communication skills in relation to dealing with customers and team members

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REQUIRED SKILLS AND KNOWLEDGE
• apply questioning and active listening skills for example when obtaining information from customers • apply oral communication skills sufficient to convey information and concepts to customers • apply planning and organising skills to own work activities, including making good use of time and resources, sorting out priorities and monitoring one's own performance • interact effectively with other persons both on a one-to-one basis and in groups, including understanding and responding to the needs of a customer and working effectively as a member of a team to achieve a shared goal • establish safe and effective work processes which anticipate and/or resolve problems and downtime, to systematically develop solutions to avoid or minimise reworking and avoid wastage • use mathematical ideas and techniques to calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks • use workplace technology related to repair of composite material components, including the use of specialist tooling, measuring equipment and communication devices and the reporting/recording of results
Required knowledge
A working knowledge of: • WHS regulations/requirements, equipment, material and personal safety requirements • environmental requirements • measuring procedures • technical information • types of composite materials (including fibreglass) and their application • repair procedures • manufacturer/component supplier/company policies • manual handling techniques • work organisation and planning processes • enterprise quality processes

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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EVIDENCE GUIDE	
Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • completing repair procedures to a range of components to enterprise and manufacturer/component supplier requirements • completing repair procedures without damage to tooling, equipment and persons • completing repair procedures within enterprise timeframes • completing workplace/equipment records.
Context of, and specific resources for assessment	Application of competence is to be assessed in the workplace or simulated worksite. Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints. Assessment is to comply with regulatory requirements, including Australian Standards. The following resources should be made available: • workplace location or simulated workplace • materials relevant to repair of composite material components • equipment, hand and power tooling appropriate to repair of composite material components • activities covering mandatory task requirements • specifications and work instructions.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the automotive industry's RS&R Training Package. • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. • Assessment must be by direct observation of tasks, with

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EVIDENCE GUIDE	
	questioning on underpinning knowledge and it must also reinforce the integration of key competencies. • Assessment may be applied under project related conditions and require evidence of process. • Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements. • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Composite materials	Composite materials may include fibreglass, carbon fibre and Kevlar.
Methods	Methods are to include both hand and machine operations, mixing and application.
WHS	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace

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RANGE STATEMENT	
	environment and safety, handling of materials, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances.
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulation/codes of practice and workplace policies and practices.
Safe operating procedures	Safe operating procedures are to include, but are not limited to operational risk assessment and treatments associated with vehicular movement, toxic substances, electrical safety, machinery movement and operation, manual and mechanical lifting and shifting, working in proximity to others and worksite visitors.
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and worksite evacuation.
Environmental requirements	Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management.
Quality requirements	Quality requirements are to include, but are not limited to regulations, including Australian Standards, internal company quality policy and standards and enterprise operations and procedures.
Statutory/regulatory authorities	Statutory/regulatory authorities may include Federal, State/Territory and local authorities administering acts, regulations and codes of practice.
Tooling and equipment	Tooling and equipment may include hand tooling, power tooling, specialist tooling for composite material work, mixers, moulds, jigs and measuring equipment.
Materials	Materials may include fibreglass, carbon fibre, Kevlar and cleaning materials.

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RANGE STATEMENT	
Communications	Communications are to include, but are not limited to verbal and visual instructions and fault reporting and may include worksite specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers.
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches • safe work procedures related to repair of composite material components • regulatory/legislative requirements pertaining to automotive industry, including Australian Design Rules • engineer's design specifications and instructions • organisation work specifications and requirements • instructions issued by authorised enterprise or external persons • Australian Standards.

Unit Sector(s)

Unit sector	Vehicle body

Co-requisite units

Not applicable.

Competency field

Competency field	Technical - Fabrication

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AURVTT3015 Fabricate canvas products

Modification History

Release	Comment
Release 1	Replaces AURV331423CA Fabricate and install canvas products Unit code updated to meet policy requirements Minor changes to unit title Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit covers the competence required to fabricate and install canvas products and covers. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	The unit includes identification and confirmation of work requirement, preparation for work, measuring, marking out, cutting out, assembling and installing canvas products and completion of work finalisation processes, including clean-up and documentation Work requires individuals to demonstrate judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for fabrication work	1.1. Information for work is accessed from manufacturer/ component supplier specifications and interpreted. 1.2. WHS requirements, including personal protection needs, are observed throughout the work. 1.3. Materials are selected and inspected for quality. 1.4. Components, tooling and equipment for fabrication are identified, selected and prepared in accordance with worksite procedures. 1.5. Procedures are determined to minimise waste material. 1.6. Procedures are identified for maximising energy efficiency while completing the job.
2. Measure, mark out and cut canvas products	2.1. Information for measuring, marking out and cutting is interpreted and followed. 2.2. Measurements are accessed from manufacturer/component supplier specifications and/or directly measured fitting requirements. 2.3. Marking out and cutting are carried out and

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ELEMENT	PERFORMANCE CRITERIA
	completed in accordance with work plan and specifications. 2.4. Measurements, marking out and cutting are checked for conformity to specifications in accordance with worksite procedures.
3. Make up/assemble canvas products	3.1. Information for following production process is accessed from manufacturer/component supplier specifications, interpreted and followed. 3.2. Make up/assembly of canvas products is carried out and completed in accordance with work plan and specifications. 3.3. Damage to equipment or machinery is avoided. 3.4. Production is checked for conformity to specifications in accordance with worksite procedures.
4. Install canvas products	4.1. Information for installing is interpreted and applied. 4.2. Installing is carried out to enterprise and/or manufacturer/ component supplier specifications. 4.3. Installing is carried out without damage to equipment.
5. Clean up work area and maintain equipment	5.1. Material that can be reused is collected and stored. 5.2. Waste and scrap is removed following workplace procedures. 5.3. Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures. 5.4. Unserviceable equipment is tagged and faults identified in accordance with workplace procedures. 5.5. Operator maintenance is completed in accordance with manufacturer/component supplier specifications and worksite procedures. 5.6. Tooling is maintained in accordance with workplace procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE
Required skills
• collect, organise and understand information related to work orders, plans and safety procedures for fabricating and installing canvas products • communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with worksite supervisor, other workers and customers, and the reporting of work outcomes and problems • plan and organise activities, including preparation and layout of worksite and obtaining of equipment and materials to avoid backtracking, workflow interruptions or wastage • work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity • use mathematical ideas and techniques to complete measurements and estimate material requirements for the work • use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material • use workplace technology related to accessing, interpreting and applying technical information and using tooling and equipment, and fabricating and installing canvas products
Required knowledge
A working knowledge of: • WHS regulations/requirements and personal safety requirements • equipment safety requirements • types, characteristics and applications of canvas • adhesives/glues/material safety data sheets information • job planning and drawing • production methods and procedures, including measuring, marking out, cutting and make up/assembly of canvas products • installation processes and techniques • technical information • enterprise quality procedures • work organisation and planning processes

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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EVIDENCE GUIDE	
Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • applying WHS policy and procedures • operating machinery • measuring, marking out, cutting and making up/ assembling a range of canvas products • installing a range of canvas products • completing post-activity housekeeping.
Context of, and specific resources for assessment	Application of competence is to be assessed in the workplace or simulated worksite. Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints. Assessment is to comply with regulatory requirements, including Australian Standards. The following resources should be made available: • workplace location or simulated workplace • materials relevant to fabricating and installing canvas products • equipment, hand and power tooling appropriate to fabricating and installing canvas products • activities covering mandatory task requirements • specifications and work instructions.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the automotive industry's RS&R Training Package. • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. • Assessment must be by direct observation of tasks, with

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EVIDENCE GUIDE	
	questioning on underpinning knowledge and it must also reinforce the integration of key competencies. • Assessment may be applied under project related conditions and require evidence of process. • Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements. • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Methods	Methods are to include: • quantity estimation, canvas selection • hand sewing, machine sewing • measuring, marking out, cutting, reinforcing, edge finishing, mechanical fastening, shaping, bonding, gluing, assembling and installing.
Canvas products/covers	Canvas products/covers may be for recreational equipment, marine craft, aircraft, heavy vehicles, plant and agricultural equipment.
WHS	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This

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RANGE STATEMENT	
	may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of materials, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances.
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulation/codes of practice and workplace policies and practices.
Safe operating procedures	Safe operating procedures are to include, but are not limited to operational risk assessment and treatments associated with vehicular movement, toxic substances, electrical safety, machinery movement and operation, manual and mechanical lifting and shifting, working in proximity to others and worksite visitors.
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and worksite evacuation.
Environmental requirements	Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management.
Quality requirements	Quality requirements are to include, but are not limited to regulations, including Australian Standards, internal company quality policy and standards and enterprise operations and procedures.
Statutory/regulatory authorities	Statutory/regulatory authorities may include Federal, State/Territory and local authorities administering acts, regulations and codes of practice.
Tooling and equipment	Tooling and equipment may include hand tooling, power tooling, air tooling, specialist tooling, sewing machines, needles, cutting equipment (scissors, knives), measuring and marking out equipment (straight edge, tape, square, chalk).

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RANGE STATEMENT	
Materials	Materials may include adhesives, glues, canvas, thread, rope, window fabric, jute webbing, sailtrack, fasteners and zipper/slides.
Communications	Communications are to include, but are not limited to verbal and visual instructions and fault reporting and may include worksite specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers.
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches • safe work procedures related to fabricating and installing canvas products • regulatory/legislative requirements pertaining to automotive industry, including Australian Design Rules • engineer's design specifications and instructions • organisation work specifications and requirements • instructions issued by authorised enterprise or external persons • Australian Standards.

Unit Sector(s)

Unit sector	Vehicle body

Co-requisite units

Not applicable.

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Competency field

Competency field	Technical - Trimming and Upholstery

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AURVTT3016 Fabricate frame structures

Modification History

Release	Comment
Release 1	Replaces AURV331423DA Fabricate and install frame structures Unit code updated to meet policy requirements Minor changes to unit title Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit covers the competence required to fabricate (measure, select material and attachments, cut, make up/assemble and fit) and install frame structures. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	The unit includes identification and confirmation of work requirement, preparation for work, measuring frame requirements, selecting materials, assembling, fitting and installation of frame structure and completion of work finalisation processes, including clean-up and documentation. Work requires individuals to demonstrate judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for fabrication work	1.1. Information for work is accessed from manufacturer/ component supplier specifications and interpreted. 1.2. WHS requirements, including personal protection needs, are observed throughout the work. 1.3. Materials are selected and inspected for quality. 1.4. Components, tooling and equipment for fabrication are identified, selected and prepared in accordance with worksite procedures. 1.5. Procedures are determined to minimise waste material. 1.6. Procedures are identified for maximising energy efficiency while completing the job.
2. Measure job and	2.1. Information for measuring and determining frame

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ELEMENT	PERFORMANCE CRITERIA
determine frame requirements	requirements is interpreted and followed. 2.2. Measurements are accessed from manufacturer/component supplier specifications and/or from directly measured fitting requirements. 2.3. Frame dimensions are confirmed against job/customer requirements.
3. Select frame materials and attachments/joiners	3.1. Information for selection of materials and attachments/ joiners is interpreted and followed. 3.2. Materials type and size are selected according to frame dimension, in-service environment and customer requirements. 3.3. Attachment methods and materials are selected according to industry regulations/guidelines, WHS legislation, and enterprise procedures/policies.
4. Cut materials, fit frame attachments/joiners and assemble frame	4.1. Information for cutting materials, fitting of attachments/ joiners and assembly is interpreted and followed. 4.2. Tooling and equipment are used for cutting and fitting attachments/joiners. 4.3. Cutting, attachment/joiner fitting and assembly is carried out and completed in accordance with work plan and specifications. 4.4. Component lengths, fittings and frame assembly dimensions are checked for conformity to specifications in accordance with worksite procedures. 4.5. All cutting, fitting and assembly operations are carried out according to industry regulations/guidelines, WHS legislation, and enterprise procedures/policies.
5. Fit fabricated frame structure	5.1. Fitting is completed without causing damage to equipment, component/system or machinery. 5.2. Information for fitting fabricated frame is interpreted and followed. 5.3. Frame fitting is carried out and completed in accordance with work plan and specifications. 5.4. Production is checked for conformity to specifications in accordance with worksite procedures.
6. Install and fasten frame structure	6.1. Information for installation and fastening is interpreted and followed. 6.2. Installation and fastening processes and methods

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ELEMENT	PERFORMANCE CRITERIA
	are accessed from manufacturer/component supplier specifications and/or determined from existing fitting. 6.3. Installation and fastenings are checked for conformity to manufacturer/component supplier specifications and vehicle operational requirements.
7. Clean up work area and maintain equipment	7.1. Material that can be reused is collected and stored. 7.2. Waste and scrap is removed following workplace procedure. 7.3. Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures. 7.4. Unserviceable equipment is tagged and faults identified in accordance with workplace procedures. 7.5. Operator maintenance is completed in accordance with manufacturer/component supplier specifications and worksite procedures. 7.6. Tooling is maintained in accordance with workplace procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• collect, organise and understand information related to work orders, plans and safety procedures for fabricating and installing frame structures • communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with worksite supervisor, other workers and customers, and the reporting of work outcomes and problems • plan and organise activities, including preparation and layout of worksite and obtaining of equipment and materials to avoid backtracking, workflow interruptions or wastage • work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity • use mathematical ideas and techniques to complete measurements and estimate material requirements for work • establish safe and effective work processes which anticipate and/or resolve problems and downtime, to systematically develop solutions to avoid or minimise

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REQUIRED SKILLS AND KNOWLEDGE
reworking and avoid wastage • use workplace technology related to fabrication and installation of frame structures, including the use of measuring equipment, computerised technology and communication devices and the reporting/recording of results
Required knowledge
A working knowledge of: • WHS regulations/requirements and personal safety requirements • technical information • equipment safety requirements/operation of tube bending and wire swaging equipment • types of frames, fittings and fasteners • frame positioning and fixing methods and procedures • types of frame materials and their application • production methods and procedures, including frame design, material and hardware selection, measuring, cutting and assembly/fitting up • enterprise quality procedures • work organisation and planning processes

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • fabricating a range of frame structures following

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EVIDENCE GUIDE	
	production processes • measuring job and determining frame requirements • selecting frame materials and attachments • assembling and fitting/attaching frame • monitoring production processes, specifications and outputs • completing post-activity housekeeping.
Context of, and specific resources for assessment	Application of competence is to be assessed in the workplace or simulated worksite. Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints. Assessment is to comply with regulatory requirements, including Australian Standards. The following resources should be made available: • workplace location or simulated workplace • materials relevant to fabrication and installation of frame structures • equipment, hand and power tooling appropriate to fabrication and installation of frame structures • activities covering mandatory task requirements • specifications and work instructions.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the automotive industry's RS&R Training Package. • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. • Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies. • Assessment may be applied under project related conditions and require evidence of process. • Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of

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EVIDENCE GUIDE	
	performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements. • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Methods	Methods are to include: • material selection, measuring, cutting, mechanical fastening, wire swaging, shaping, bending, riveting, and fitting • dismantling, assembling, fitting, fixing.
Frame structures	Frame structures may be those in recreational equipment, marine craft, aircraft, heavy vehicles, plant and agricultural equipment.
WHS	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of materials, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances.
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulation/codes of practice and workplace policies and practices.
Safe operating procedures	Safe operating procedures are to include, but are not limited to operational risk assessment and

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RANGE STATEMENT	
	treatments associated with vehicular movement, toxic substances, electrical safety, machinery movement and operation, manual and mechanical lifting and shifting, working in proximity to others and worksite visitors.
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and worksite evacuation.
Environmental requirements	Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management.
Quality requirements	Quality requirements are to include, but are not limited to regulations, including Australian Standards, internal company quality policy and standards and enterprise operations and procedures.
Statutory/regulatory authorities	Statutory/regulatory authorities may include Federal, State/Territory and local authorities administering acts, regulations and codes of practice.
Tooling and equipment	Tooling and equipment may include hand tooling, power tooling, air tooling, specialist tooling, rivet gun and rivets, machines, drills, cutting equipment, measuring and assembly equipment (straight edge, tape, square).
Materials	Materials may include stainless steel hardware, bow sets, fasteners, stainless steel wire and tube, and aluminium tube.
Communications	Communications are to include, but are not limited to verbal and visual instructions and fault reporting and may include worksite specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers.
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions,

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RANGE STATEMENT	
	signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches • safe work procedures related to fabrication and installation of frame structures • regulatory/legislative requirements pertaining to automotive industry, including Australian Design Rules • engineer's design specifications and instructions • organisation work specifications and requirements • instructions issued by authorised enterprise or external persons • Australian Standards.

Unit Sector(s)

Unit sector	Vehicle body

Co-requisite units

Not applicable.

Competency field

Competency field	Technical - Trimming and Upholstery

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AURVTT3019 Fabricate and install canopies and curtains

Modification History

Release	Comment
Release 1	Replaces AURV331423GA Fabricate and install canopies and curtains Unit code updated to meet policy requirements Reference to OHS legislation replaced with new WHS legislation Licensing statement added to unit descriptor

Unit Descriptor

Unit descriptor	This unit covers the competence required to fabricate (measure, mark out, cut and make up/assemble) and install canopies and curtains. Licensing, legislative, regulatory or certification requirements may apply to this unit in some jurisdictions. Users are advised to check with the relevant regulatory authority.

Application of the Unit

Application of the unit	The unit includes identification and confirmation of work requirement, preparation for work, measuring, marking out, cutting, assembling, installing and fastening canopies and curtains and completion of work finalisation processes, including clean-up and documentation. Work requires individuals to demonstrate judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for fabrication work	1.1. Information for work is accessed from manufacturer/ component supplier specifications and interpreted. 1.2. WHS requirements, including personal protection needs, are observed throughout the work. 1.3. Materials are selected and inspected for quality. 1.4. Components, tooling and equipment for fabrication are identified, selected and prepared in accordance with worksite procedures. 1.5. Procedures to minimise waste material are determined. 1.6. Procedures for maximising energy efficiency while completing the job are identified.
2. Measure, mark out and cut canopies and curtains	2.1. Information for measuring, marking out and cutting is interpreted and followed. 2.2. Measurements are accessed from manufacturer/component supplier specifications and/or directly measured fitting requirements. 2.3. Marking out and cutting are carried out and

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ELEMENT	PERFORMANCE CRITERIA
	completed in accordance with work plan and specifications. 2.4. Measurements, marking out and cutting are checked for conformity to specifications and customer requirements in accordance with worksite procedures.
3. Make up/assemble canopies and curtains	3.1. Production process information is accessed from manufacturer/component supplier specifications and workplace procedures and is interpreted and followed. 3.2. Make up/assembly of canopies and curtains is carried out and completed in accordance with work plan and specifications. 3.3. Damage to equipment or machinery is avoided. 3.4. Production is checked for conformity to specifications in accordance with worksite procedures.
4. Install and fasten canopies and curtains	4.1. Information for installation and fastening is interpreted and followed. 4.2. Installation and fastening processes and methods are accessed from manufacturer/component supplier specifications and/or determined from existing fitting. 4.3. Installation and fastenings are checked for conformity to manufacturer/component supplier specifications and vehicle operational requirements.
5. Clean up work area and maintain equipment	5.1. Material that can be reused is collected and stored. 5.2. Waste and scrap is removed following workplace procedure. 5.3. Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures. 5.4. Unserviceable equipment is tagged and faults identified in accordance with workplace procedures. 5.5. Operator maintenance is completed in accordance with manufacturer/component supplier specifications and worksite procedures. 5.6. Tooling is maintained in accordance with workplace procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- collect, organise and understand information related to work orders, plans and safety procedures for fabricating and installing canopies and curtains
- communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with worksite supervisor, other workers and customers, and the reporting of work outcomes and problems
- plan and organise activities, including preparation and layout of worksite and obtaining of equipment and materials to avoid backtracking, workflow interruptions or wastage
- work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity
- use mathematical ideas and techniques to complete measurements and estimate material requirements for the work
- use pre-checking and inspection techniques to anticipate planning and scheduling problems, avoid wastage of time and material
- use workplace technology related to fabrication and installation of canopies and curtains, including the use of specialist tooling, measuring equipment, computerised technology and communication devices and the reporting/recording of results

Required knowledge

A working knowledge of:

- WHS regulations/requirements and personal safety requirements
- equipment safety requirements
- technical information types of canopy and curtain materials and their application
- adhesives/glues/material safety data sheets information
- sewing procedures, including seams, binding and pockets
- production methods and procedures, including planning, measuring, trade drawing, marking out, cutting and making up/assembling
- fitting and fastening/attachment methods, processes, procedures and applications
- enterprise quality procedures
- work organisation and planning processes

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • observing safety procedures and requirements • communicating effectively with others involved in or affected by the work • selecting methods and techniques appropriate to the circumstances • completing preparatory activity in a systematic manner • fabricating canopies and curtains/following production processes • measuring, marking out, cutting and making up/ assembling canopies and curtains • fitting and fixing a range of canopies and curtains • completing post-activity housekeeping.
Context of, and specific resources for assessment	Application of competence is to be assessed in the workplace or simulated worksite. Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints. Assessment is to comply with regulatory requirements, including Australian Standards. The following resources should be made available: • workplace location or simulated workplace • materials relevant to fabrication and installation of canopies and curtains • equipment, hand and power tooling appropriate to fabrication and installation of canopies and curtains • activities covering mandatory task requirements • specifications and work instructions.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the automotive industry's RS&R Training Package. • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge.

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EVIDENCE GUIDE	
	• Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies. • Assessment may be applied under project related conditions and require evidence of process. • Assessment must confirm a reasonable inference that competence is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances. Evidence of performance may be provided by customers, team leaders/members or other persons subject to agreed authentication arrangements. • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
WHS	WHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of materials, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances.
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation/regulation/codes of practice and workplace policies and practices.

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RANGE STATEMENT	
Safe operating procedures	Safe operating procedures are to include, but are not limited to operational risk assessment and treatments associated with vehicular movement, toxic substances, electrical safety, machinery movement and operation, manual and mechanical lifting and shifting, working in proximity to others and worksite visitors.
Emergency procedures	Emergency procedures related to this unit are to include, but are not limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and worksite evacuation.
Environmental requirements	Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management.
Quality requirements	Quality requirements are to include, but are not limited to regulations, including Australian Standards, internal company quality policy and standards and enterprise operations and procedures.
Statutory/regulatory authorities	Statutory/regulatory authorities may include Federal, State/Territory and local authorities administering acts, regulations and codes of practice.
Tooling and equipment	Tooling and equipment may include hand tooling, power tooling, air tooling, specialist tooling, sewing machines, needles, cutting equipment (scissors, knives), measuring and marking out equipment, (straight edge, tape, square, chalk).
Materials	Materials may include adhesives, glues, bow sets, fasteners, thread, vinyl, fabric, canvas, plastic products and binding roll.
Communications	Communications are to include, but are not limited to verbal and visual instructions and fault reporting and may include worksite specific instructions, written instructions, plans or instructions related to job/task, telephones and pagers.

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RANGE STATEMENT	
Information/documents	Sources of information/documents may include: • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets, diagrams or sketches • safe work procedures related to fabrication and installation of canopies and curtains • regulatory/legislative requirements pertaining to automotive industry, including Australian Design Rules • engineer's design specifications and instructions • organisation work specifications and requirements • instructions issued by authorised enterprise or external persons • Australian Standards.

Unit Sector(s)

Unit sector	Vehicle body

Co-requisite units

Not applicable.

Competency field

Competency field	Technical - Trimming and Upholstery

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BSBCUS501C Manage quality customer service

Modification History

Release	Comments
Release 1	New release of this Qualification released with *version 6 of BSB07* Business *Services Training Package*. Revised unit. Required skills updated to focus on learning and development practices and compliance with policy and procedures.

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to develop strategies to manage organisational systems that ensure products and services are delivered and maintained to standards agreed by the organisation.

Operators may have staff involved in delivering customer service and are responsible for the quality of their work. In many instances the work will occur within the organisation's policies and procedures framework. At this level, the exercise of considerable discretion and judgement, using a range of problem solving and decision making strategies, will be required.

Application of the Unit

Many managers are involved in ensuring that products and services are delivered and maintained to standards agreed by the organisation.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Element	Performance Criteria
Elements describe the essential outcomes of a unit of competency.	*Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.*

Elements and Performance Criteria

1. Plan to meet internal and external customer requirements	1.1 Investigate, identify, assess, and include the needs of ***customers*** in planning processes 1.2 Ensure plans achieve the ***quality***, time and cost specifications agreed with customers
2. Ensure delivery of quality products and services	2.1 Deliver ***products and services*** to customer specifications within organisation's business plan 2.2 Monitor team performance to consistently meet the organisation's quality and delivery standards 2.3 Assist colleagues to overcome difficulty in meeting customer service standards
3. Monitor, adjust and review customer service	3.1 Develop and use ***strategies*** to monitor progress in achieving product and/or service targets and standards 3.2 Develop and use strategies to obtain customer feedback to improve the provision of products and services 3.3. Develop, procure and use ***resources*** effectively to provide quality products and services to customers 3.4 Make decisions to overcome problems and to adapt customer services, products and service delivery in consultation with appropriate individuals and groups 3.5 Manage records, reports and recommendations within the organisation's systems and processes

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

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Required skills

- analytical skills to identify trends and positions of products and services
- communication skills to:
  - coach and mentor staff and colleagues
  - monitor and advise on customer service strategies
- literacy skills to:
  - edit and proofread texts to ensure clarity of meaning and accuracy of grammar and punctuation
  - prepare general information and papers according to target audience
  - read and understand a variety of texts
- problem-solving skills to:
  - deal with customer enquiries or complaints
  - deal with complex and non-routine difficulties
- technology skills to select and use technology appropriate to a task
- self-management skills to:
  - comply with policies and procedures
  - consistently evaluate and monitor own performance
  - seek learning opportunities.

Required knowledge

- key provisions of relevant legislation from all levels of government that may affect aspects of business operations, such as:
  - anti-discrimination legislation
  - Australian consumer law
  - ethical principles
  - codes of practice
  - privacy laws
  - financial legislation
  - occupational health and safety (OHS)
- organisational policy and procedures for customer service including handling customer complaints
- service standards and best practice models
- public relations and product promotion
- techniques for dealing with customers, including customers with specific needs
- techniques for solving complaints including the principles and techniques involved in the management and organisation of:
  - customer behaviour
  - customer needs research
  - customer relations
  - ongoing product and/or service quality

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- problem identification and resolution
- quality customer service delivery
- record keeping and management methods
- strategies for monitoring, managing and introducing ways to improve customer service relationships
- strategies to obtain customer feedback.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • plans, policies or procedures for delivering quality customer service • demonstrated techniques in solving complex customer complaints and system problems that lead to poor customer service • knowledge of techniques for solving complaints.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • assessment of written reports • demonstration of techniques • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • observation of performance in role plays • evaluation of leadership, supervision, coaching and mentoring used to assist colleagues to overcome difficulty in meeting customer service standards • review of strategies developed and used to monitor progress in achieving product and/or service targets and standards • review of records, reports and recommendations about managing customer service.

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Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Customers may be:	• Board members • clients, purchasers of services • co-workers, peers and fellow frontline managers • members of the general public who make contact with the organisation, such as prospective purchasers of services • potential funding bodies • supervisors • suppliers of goods and services and contractors providing goods and services.
Quality may refer to:	• characteristics of a product, system, service or process that meet the requirements of customers and interested parties.
Products and services may include:	• either products or services • goods • ideas • infrastructure • private or public sets of benefits.
Strategies may refer to:	• databases and other controls to record and compare data over time • electronic feedback mechanisms using intranet, internet and email • feedback forms and other devices to enable communication from customers • long-term or short-term plans for monitoring achievement and evaluating effectiveness • policies and procedures • questionnaires, survey and interviews • training and development activities.

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Resources may include:	• buildings/facilities • equipment • finance • information • people • power/energy • technology • time.

Unit Sector(s)

Stakeholder Relations – Customer Service

Custom Content Section

Not applicable.

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BSBFIM501A Manage budgets and financial plans

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to undertake financial management within a work team in an organisation. This includes planning and implementing financial management approaches, supporting team members whose role involves aspects of financial operations, monitoring and controlling finances, and reviewing and evaluating effectiveness of financial management processes in line with the financial objectives of the work team and the organisation. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit addresses the requirement for managers to ensure that financial resources are used effectively. This is done by ensuring access to budget/s and ongoing monitoring expenditure against the budget/s. The unit applies to managers working in small and large business environments and not for profit organisations.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Plan financial management approaches	1.1. Access ***budget/financial plans*** for the work team 1.2. Clarify budget/financial plans with ***relevant personnel*** within the organisation to ensure that documented outcomes are achievable, accurate and comprehensible 1.3. Negotiate any changes required to be made to budget/financial plans with relevant personnel within the organisation 1.4. Prepare ***contingency plans*** in the event that initial plans need to be varied
2. Implement financial management approaches	2.1. Disseminate relevant details of the agreed budget/financial plans to team members 2.2. Provide ***support*** to ensure that team members can competently perform ***required roles*** associated with the management of finances 2.3. Determine and access ***resources and systems*** to manage financial management processes within the

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ELEMENT	PERFORMANCE CRITERIA
	work team
3. Monitor and control finances	3.1. Implement ***processes*** to monitor actual expenditure and to control costs across the work team 3.2. Monitor expenditure and costs on an agreed cyclical basis to identify cost variations and expenditure overruns 3.3. Implement, monitor and modify contingency plans as required to maintain financial objectives 3.4. ***Report*** on budget and expenditure in accordance with organisational protocols
4. Review and evaluate financial management processes	4.1. Collect and collate for analysis, ***data and information on the effectiveness of financial management processes*** within the work team 4.2. Analyse data and information on the effectiveness of financial management processes within the work team and identify, document and recommend any improvements to existing processes 4.3. Implement and monitor agreed improvements in line with financial objectives of the work team and the organisation

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• numeracy skills to read and understand a budget and to update a budget • technology skills to use software associated with financial record keeping.
Required knowledge
• basic accounting principles • organisational requirements related to financial management • relevant legislation and current requirements of the Australian Taxation Office, including GST • requirements for organisational record keeping and auditing • principles and techniques involved in: • budgeting

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REQUIRED SKILLS AND KNOWLEDGE
• cash flows • electronic spreadsheets • GST • ledgers and financial statements • profit and loss statements.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • financial skills required to work with and interpret budgets, ageing summaries, cash flow, petty cash, GST, and profit and loss statements • knowledge of the record keeping requirements for the ATO and for auditing purposes.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • assessment of written reports indicating broad knowledge of managing budgets and managing financial resources in the organisation • demonstration of techniques using financial record keeping software • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • oral or written questioning to assess knowledge of requirements for organisational record keeping and auditing

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EVIDENCE GUIDE	
	• review of contingency plans • review of identification of cost variations and expenditure overruns • evaluation of documentation reportingon budget and expenditure • review of documentation identifying and recommending improvements to financial management processes.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other units from the Diploma of Management.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Budget/financial plans may include:	• cash flow projections • long-term budgets/plans • operational plans • short-term budgets/plans • spreadsheet-based financial projections • targets or key performance indicators for production, productivity, wastage, sales, income and expenditure
Relevant personnel may include:	• financial managers, accountants or financial controllers • supervisors, other frontline managers
Contingency plans may include:	• contracting out or outsourcing human resources and other functions or tasks • diversification of outcomes • finding cheaper or lower quality raw materials and consumables

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RANGE STATEMENT	
	• increasing sales or production • recycling and re-using • rental, hire purchase or alternative means of procurement of required materials, equipment and stock • restructuring of organisation to reduce labour costs • risk identification, assessment and management processes • seeking further funding • strategies for reducing costs, wastage, stock or consumables • succession planning
Support may include:	• access to specialist advice • documentation of procedures • help desk or identified experts within the organisation • information briefings or sessions • intranet-based information • training including mentoring, coaching and shadowing
Required roles may include:	• arranging for use of corporate credit cards • banking • debt collection • ensuring security, accuracy and currency of financial operations • invoicing clients, customers and consumers • maintaining journals, ledgers and other record keeping systems • maintaining petty cash system • purchasing and procurement • wages and salaries payments and record keeping
Resources and systems may include:	• hardware and software • human, physical or financial resources • record keeping systems (electronic and paper-based) • specialist advice or support

Processes to monitor actual expenditure and to control costs across the work team include:	• reporting of:
	  • assets
	  • consumables

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RANGE STATEMENT	
	• equipment • expenditure • income • stock • wastage
Reporting may include data from:	• bank statements • credit card statements • financial reports • invoices and receipts • ledgers and journals • logs • petty cash records • spreadsheet-based records
Data and information on the effectiveness of financial management processes may include records (paper-based and electronic) related to:	• bank account records • cash flow data • contracts • credit card receipts • employee timesheets • files of paid purchase and service invoices • income and expenditure • insurance reports • invoices • job costings • petty cash receipts • quotations • taxation records • wages/salaries books

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Management

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Co-requisite units

Co-requisite units		

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BSBINM501A Manage an information or knowledge management system

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to organise learning to use an information or knowledge management system and to manage the use of the system. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies to managers who have responsibility for seeing that key information and corporate knowledge are retained, accessible to others and improve business outcomes. The unit does not address the requirement to select the technical system (software or hardware), which is seen as the role of an information technology specialist, although in some smaller organisations this may be a part of the manager's role.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Organise learning to use information or knowledge management system	1.1. Identify learning needs of ***relevant personnel*** and ***stakeholders*** for input into, and use of, ***an information or knowledge management system*** 1.2. Identify and secure human, financial and physical resources required for ***learning activities*** to use an information or knowledge management system 1.3. Organise and facilitate learning activities 1.4. Promote and support use of the system throughout the organisation 1.5. Monitor and document effectiveness of learning activities
2. Manage use of information or knowledge management system	2.1. Ensure implementation of ***policies and procedures for the information or knowledge management system*** are monitored for compliance, effectiveness and efficiency 2.2. Address implementation issues and problems as they arise

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Monitor integration and alignment with data and information systems 2.4. Collect information on achievement of ***performance measures*** 2.5. Manage contingencies such as system failure or technical difficulties by accessing technical specialist help as required
3. Review use of information or knowledge management system	3.1. Analyse effectiveness of system and report on strengths and limitations of the system 3.2. Review business and operational plan and determine how effectively the system is contributing to intended outcomes 3.3. Make recommendations for improvement to system, policy or work practices

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- analytical and problem-solving skills to ensure the system is working in accordance with organisational expectations and to deal with contingencies
- technology skills to work with and manage the use of the information or knowledge management system.

Required knowledge

- legislation, codes of practice and national standards, for example:
  - privacy and confidentiality legislation
  - freedom of information legislation
  - AS 5037:2005 Knowledge management - A guide
- organisational policies and procedures, for example:
  - records management
  - information management
  - customer service
  - commercial confidentiality
- organisational operations, and existing data and information systems.

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • analysis of the strengths and weaknesses of information or knowledge management system/s and evaluation of suitability for a particular work or organisational context • knowledge of relevant legislation, codes of practice and national standards.
Context of and specific resources for assessment	Assessment must ensure: • access to system • access to system user feedback.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • assessment of written reports reviewing and evaluating information or knowledge management systems • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • observation of presentations • oral or written questioning to assess knowledge of relevant organisational policies and procedures • review of identified learning needs personnel and stakeholders regarding the information or knowledge management system • evaluation of monitoring and documentation about the effectiveness of learning activities • analysis documentation reporting on the strengths and limitations of the system • review of recommendations made for improvements to the system, policy or work practices.
Guidance information for	Holistic assessment with other units relevant to the

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EVIDENCE GUIDE	
assessment	industry sector, workplace and job role is recommended, for example: • other units from the Diploma of Management.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Relevant personnel include:	• managers, leaders, supervisors and coordinators • owners • staff, team members and colleagues
Stakeholders include:	• clients and customers • employee representatives • funding bodies • industry, professional and trade associations • regulatory bodies and authorities • sponsors • tenderers, suppliers and contractors
Information or knowledge management is defined as:	• equipment, strategies, methods, activities and techniques used formally and informally by individuals and the organisation to identify, collect, organise, store, retrieve, analyse, share and draw on information and knowledge valuable to the work of the organisation
An information or knowledge management system:	• comprises policies, protocols, procedures and practices to manage information or knowledge within the organisation and among relevant stakeholders
Learning activities include:	• coaching and mentoring programs • help desks • information sessions, briefings, workshops and training programs • paper-based or electronic (including intranet)

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RANGE STATEMENT	
	learning opportunities • use of expert workers such as coaches and mentors to help other personnel use the system
Policies and procedures for the information or knowledge management system cover:	• complying with legislative requirements (such as privacy, confidentiality and defamation requirements) and other policies and procedures • content guidelines • ensuring accuracy and relevance of knowledge input into the system • mechanisms, formats and styles of input to system, including appropriate alternative formats for people with a disability • permissions for input • removing out-of-date, inaccurate and content that is no longer relevant • selecting, maintaining and disposing of knowledge in the system • sharing knowledge in the system
Performance measures include:	• key performance indicators • other systems and measures to enable assessment of how, when, where and why outcomes are being achieved • performance objectives • performance standards (including codes of conduct) • qualitative or quantitative mechanisms to measure individual performance

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Management

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Co-requisite units

Co-requisite units		

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BSBMGT403A Implement continuous improvement

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to implement the organisation's continuous improvement systems and processes. Particular emphasis is on using systems and strategies to actively encourage the team to participate in the process, monitoring and reviewing performance, and identifying opportunities for further improvements. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	Frontline managers have an active role in implementing the continuous improvement process to achieve the organisation's objectives. Their position, closely associated with the creation and delivery of products and services, means that they have an important role in influencing the ongoing development of the organisation. At this level, work will normally be carried out within routine and non routine methods and procedures, which require planning and evaluation, and leadership and guidance of others.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Implement continuous improvement systems and processes	1.1. Implement ***systems*** to ensure that individuals and teams are actively encouraged and supported to ***participate in decision making processes***, assume responsibility and exercise initiative 1.2. Communicate the organisation's ***continuous improvement processes*** to individuals and teams, and obtain feedback 1.3. Ensure effective ***mentoring and coaching*** allows individuals and teams to implement the organisation's continuous improvement processes
2. Monitor and review performance	2.1. Use the organisation's systems and ***technology*** to monitor and review progress and to identify ways in which planning and operations could be improved 2.2. Improve ***customer service*** through continuous improvement techniques and processes

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Formulate and communicate recommendations for adjustments to those who have a role in their development and implementation
3. Provide opportunities for further improvement	3.1. Implement ***processes to ensure that team members are informed of savings and productivity/service improvements*** in achieving the business plan 3.2. Document work performance to aid the identification of further opportunities for improvement 3.3. Manage records, reports and recommendations for improvement within the organisation's systems and processes

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

• communication skills to:
  • coach and mentor team members
  • gain the commitment of individuals and teams to continuously improve
• innovation skills to design better ways of performing work.

Required knowledge

• principles and techniques associated with:
  • benchmarking
  • best practice
  • change management
  • continuous improvement systems and processes
  • quality systems.

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the

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EVIDENCE GUIDE	
performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • taking active steps to implement, monitor and adjust plans, processes and procedures to improve performance • supporting others to implement the continuous improvement system/processes, and to identify and report opportunities for further improvement • knowledge of principles and techniques associated with continuous improvement systems and processes.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • assessment of written reports • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • observation of presentations • oral or written questioning to assess knowledge of principles and techniques associated with change management • review of how the organisation's continuous improvement processeswascommunicated to individuals and teams • review of documentation of work performance.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other units from the Certificate IV in Frontline Management.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Systems may refer to:	• forums, meetings • newsletters and reports • organisational policies and procedures • web-based communication devices
Participation in decision making processes may include:	• feedback in relation to outcomes of the consultative process • processes which ensures all employees have the opportunity to contribute to organisational issues
Continuous improvement processes may include:	• cyclical audits and reviews of workplace, team and individual performance • evaluations and monitoring of effectiveness • implementation of quality systems, such as International Standardization for Organization (ISO) • modifications and improvements to systems, processes, services and products • policies and procedures which allow the organisation to systematically review and improve the quality of its products, services and procedures • seeking and considering feedback from a range of stakeholders
Mentoring and coaching may refer to:	• providing assistance with problem-solving • providing feedback, support and encouragement • teaching another member of the team, usually focusing on a specific work task or skill
Technology may include:	• computerised systems and software such as databases, project management and word processing • telecommunications devices • any other technology used to carry out work roles and responsibilities

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RANGE STATEMENT	
Customer service may be:	• internal or external • to existing, new or potential clients
Processes to ensure that team members are informed of savings and productivity/service improvements may refer to:	• email/intranet, newsletters or other communication devices • newsletters and bulletins • staff reward mechanisms • team meetings

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Management

Co-requisite units

Co-requisite units		

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BSBMGT502B Manage people performance

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to manage the performance of staff who report to them directly. Development of key result areas and key performance indicators and standards, coupled with regular and timely coaching and feedback, provide the basis for performance management. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies to all managers and team leaders who manage people. It covers work allocation and the methods to review performance, reward excellence and provide feedback where there is a need for improvement. The unit makes the link between performance management and performance development, and reinforces both functions as a key requirement for effective managers. This is a unit that all managers/prospective managers who have responsibility for other employees should strongly consider undertaking.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Allocate work	1.1. Consult relevant groups and individuals on work to be allocated and resources available 1.2. Develop work plans in accordance with operational plans 1.3. Allocate work in a way that is efficient, cost effective and outcome focussed 1.4. Confirm ***performance standards***, ***Code of Conduct*** and work outputs with relevant teams and individuals 1.5. Develop and agree ***performance indicators*** with relevant staff prior to commencement of work 1.6. Conduct ***risk analysis*** in accordance with the organisational risk management plan and legal requirements
2. Assess performance	2.1. Design ***performance management*** and review processes to ensure consistency with organisational

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ELEMENT	PERFORMANCE CRITERIA
	objectives and policies 2.2. Train participants in the performance management and review process 2.3. Conduct performance management in accordance with organisational protocols and time lines 2.4. Monitor and evaluate performance on a continuous basis
3. Provide feedback	3.1. Provide informal feedback to staff on a regular basis 3.2. Advise relevant people where there is poor performance and take necessary actions 3.3. Provide on-the-job coaching when necessary to improve performance and to confirm ***excellence in performance*** 3.4. Document performance in accordance with the organisational performance management system 3.5. Conduct formal structured feedback sessions as necessary and in accordance with organisational policy
4. Manage follow up	4.1. Write and agree performance improvement and development plans in accordance with organisational policies 4.2. Seek assistance from human resources specialists where appropriate 4.3. Reinforce excellence in performance through recognition and continuous feedback 4.4. Monitor and coach individuals with poor performance 4.5. Provide support services where necessary 4.6. Counsel individuals who continue to perform below expectations and implement the disciplinary process if necessary 4.7. ***Terminate*** staff in accordance with legal and organisational requirements where serious misconduct occurs or ongoing poor-performance continues

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
• communication skills to articulate expected standards of performance, to provide effective feedback and to coach staff who need development • risk management skills to analyse, identify and develop mitigation strategies for identified risks • planning and organisation skills to ensure a planned and objective approach to the performance management system.
Required knowledge
• relevant legislation from all levels of government that affects business operation, especially in regard to occupational health and safety and environmental issues, equal opportunity, industrial relations and anti-discrimination • relevant awards and certified agreements • performance measurement systems utilised within the organisation • unlawful dismissal rules and due process • staff development options and information.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • documented performance indicators and a critical description and analysis of performance management system from the workplace • techniques in providing feedback and coaching for improvement in performance • knowledge of relevant awards and certified agreements.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.

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EVIDENCE GUIDE	
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • analysis of responses to case studies and scenarios • assessment of written reports • demonstration of techniques in providing feedback and coaching • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • review of work plans, performance indicators, risk analysis,performance management and review processes, performance improvement and development plans.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other management units.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Performance standards mean:	• level of performance sought from an individual or group which may be expressed either quantitatively or qualitatively
Code of Conduct means:	• agreed (or decreed) set of rules relating to employee behaviour/conduct with other employees or an agreed (or decreed) set of rules relating to employee behaviour/conduct with other employees or customers
Performance indicators mean:	• measures against which performance outcomes are gauged

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RANGE STATEMENT	
Risk analysis means:	• determination of the likelihood of a negative event preventing the organisation meeting its objectives and the likely consequences of such an event on organisational performance
Performance management means:	• in accordance with relevant industrial agreements • process or set of processes for establishing a shared understanding of what an individual or group is to achieve, and managing and developing individuals in a way which increases the probability it will be achieved in both the short- and long-term
Excellence in performance means:	• regularly and consistently exceeding the performance targets established while meeting the organisation's performance standards
Termination means:	• cessation of the contract of employment between an employer and an employee, at the initiative of the employer within relevant industrial agreements

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Management

Co-requisite units

Co-requisite units		

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BSBWRK510A Manage employee relations

Modification History

Release	Comments
Release 1	This version first released with *BSB07 Business Services Training Package Version 8.0*. Replaces BSBWRK509A Manage industrial relations.

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to manage employee and industrial relations matters in an organisation. It involves using a range of specialised technical and managerial techniques to plan, carry out and evaluate own work and/or the work of a team.

It includes planning and policy development for employee relations as well as negotiation, conflict management, dispute resolution and managing industrial relations.

Application of the Unit

This unit applies to those responsible for working across an organisation to ensure that there is a policy infrastructure that ensures legislative compliance and clarifies issues.

It applies to those who respond to industrial conflict and grievances, with a well-established, sound theoretical knowledge base in human resources management and industrial relations. They may or may not have responsibility for supervising the work of others but are authorised to oversee industrial relations in the organisation. However they will have knowledge of current industrial relations trends and legislation.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Element	Performance Criteria
Elements describe the essential outcomes of a unit of competency.	*Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.*

Elements and Performance Criteria

1. Develop employee and industrial relations policies and plans	1.1 Analyse strategic plans and operational plans to determine ***long-term employee relations objectives***
	1.2 Analyse existing employee relations performance in relation to workforce objectives
	1.3 Evaluate options in terms of cost-benefit, risk-analysis and current legislative requirements
	1.4 Work with the management team to develop industrial relations policies and plans
	1.5 Identify the skills and knowledge needed by management and the workforce to effectively implement these strategies and policies
2. Implement employee relations policies and plans	2.1 Develop an ***implementation plan*** and contingency plan for the employee relations policies and strategies
	2.2 Make arrangements for training and development for identified needs to support the employee relations plan
	2.3 Undertake ***associated employee relations activities*** to reach agreement on changes required by policies or implementation plan
	2.4 Ensure procedures for addressing grievances and conflict are properly documented
	2.5 Communicate key issues about procedures for addressing grievances and conflict
	2.6 Review employee relations policies and plans to establish whether they are meeting their intended outcomes

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3. Manage negotiations to resolve conflict	3.1 Train individuals in ***conflict-management techniques and procedures***
	3.2 Identify and where possible alleviate or eliminate sources of conflict or grievance according to legal requirements
	3.3 Check documentation and other information sources to clarify issues in dispute
	3.4 Obtain expert or specialist advice and/or refer to precedents, if required
	3.5 Determine desired negotiation outcomes, negotiation strategy and negotiation timeframes
	3.6 Advocate the organisation's position in negotiation to obtain agreement
	3.7 Document and if necessary ***certify*** the agreed outcomes with the relevant jurisdiction
	3.8 Implement agreements
	3.9 Take remedial action where groups or individuals fail to abide by agreements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to advocate, consult, negotiate and mediate conflict
- innovation and problem-solving skills to manage sensitive and important issues
- planning and time-management skills to:
  - meet critical deadlines
  - sequence tasks
  - prepare submissions
  - present cases.

Required knowledge

- enterprise and workplace bargaining processes
- key entities in the Australian industrial relations system, including courts and tribunals, trade unions and employer bodies

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- relevant industrial, workplace health and safety, equal employment opportunity and anti-discrimination legislation in federal, state and territory jurisdictions.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to: • demonstrate understanding of current Australian industrial relations system and relevant legislation • document strategies and procedures for dealing with grievances and disputes • apply negotiation and conflict-resolution techniques.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • analysis of responses to case studies and scenarios • assessment of reports on industrial issues • direct questioning combined with review of portfolios of evidence and third-party workplace reports of on-the-job performance by the candidate • observation of demonstrated techniques in negotiation and case presentation • observation of presentations • oral or written questioning to assess knowledge of industrial relations legislation • review of documentation outlining long-term industrial relations objectives • review of implementation plan and contingency plan • evaluation of documentation communicating key issues about procedures for addressing grievances and conflict.

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Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other units from the Diploma of Human Resource Management.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Long-term employee relations objectives may relate to:	• effective management of grievances, conflict situations and dispute-resolution procedures • employee commitment • employee satisfaction • job design • negotiation outcomes • organisational culture • relations with unions and other peak bodies • restructuring • salary, remuneration, benefits and bonuses • workforce planning • workplace reform.
Implementation plan may include:	• documented objectives, methodology and timeframe • project plan
Associated employee relations activities may include:	• clarifying terms and conditions of employment of those persons affected • consulting with employee representatives, including unions and elected staff representatives • ensuring the legality of proposed strategies, policies and initiatives • referring to employer representatives for advice and support.
Conflict-management techniques and procedures may include:	• controlling difficult situations using legal remedies • dispute-resolution procedures • negotiating and bargaining.

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Certify refers to:	• Australian Workplace Agreements • workplace collective agreements.

Unit Sector(s)

Workforce Development – Human Resource Management

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FDFOP2005A Work in a socially diverse environment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the skills and knowledge required to work in a socially diverse environment, including the development and application of cultural awareness required to interact effectively with people from diverse backgrounds.

Application of the Unit

Application of the unit	This unit is based on the tourism and hospitality unit THHCOR2A Work in a socially diverse environment and the transport and distribution unit TDTG701A Work in a socially diverse environment. This unit involves the application of communication principles and problem solving techniques to facilitate work in a socially diverse environment.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Communicate with people from diverse backgrounds	1.1. People from all cultural groups are valued and treated with respect and sensitivity 1.2. Verbal and non-verbal communication takes account of cultural differences 1.3. Where language barriers exist, efforts are made to communicate through use of gestures or simple words in the other persons' language 1.4. Assistance from colleagues, specialist resources or outside organisations is obtained when required
2. Respond to cross-cultural misunderstandings	2.1. Issues which may cause conflict or misunderstanding in the workplace are identified 2.2. Difficulties are addressed with the appropriate people in the workplace 2.3. When difficulties or misunderstandings occur, possible cultural differences are considered 2.4. Efforts are made to resolve the misunderstanding, taking account of cultural considerations 2.5. Issues and problems that cannot be resolved are referred as required for follow up

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Ability to: • identify and recognise cultural differences in the workplace • apply understanding of cultural difference to communicate effectively to achieve work requirements, including selecting appropriate communication style to suit audience • identify and respond to cross-cultural misunderstandings • use oral communication skills/language competence to fulfil the job role as specified by the organisation, including questioning, active listening, asking for clarification and seeking advice from supervisor
Required knowledge
Knowledge of: • principles of equal employment opportunity (EEO) and anti-discrimination legislation as they apply to company and employee rights and responsibilities in the workplace • recognition of the different cultural groups in the workplace • understanding of the basis of cultural difference, including behaviour or practices that can cause offence, and related strategies for interacting in ways that are culturally sensitive • communication strategies and styles appropriate to diverse audiences related to the workplace

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment must be carried out in a manner that recognises the cultural and literacy requirements of the assessee and is appropriate to the work performed. Competence in this unit must be achieved in accordance with food safety standards and regulations.

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of ability to: • identify responsibilities according to the principles of anti-discrimination legislation • treat people from other cultures with respect and sensitivity • make efforts to communicate and understand others using verbal and non-verbal techniques • seek assistance when required to facilitate understanding • treat cross-cultural misunderstandings with sensitivity and act to resolve the matter with respect.
Context of and specific resources for assessment	Assessment must occur in a real or simulated workplace where the assessee has access to: • advice on legal rights and responsibilities relating to anti-discrimination and EEO • related company policies and procedures • opportunities to interact with others using typical workplace communication processes.
Method of assessment	This unit should be assessed together with core units and other units of competency relevant to the function or work role.
Guidance information for assessment	To ensure consistency in one's performance, competency should be demonstrated on more than one occasion over a period of time in order to cover a variety of circumstances, cases and responsibilities, and where possible, over a number of assessment activities.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Policies and procedures	Work is carried out according to company policies

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RANGE STATEMENT	
	and procedures, regulatory and licensing requirements, legislative requirements and industrial awards and agreements
Legislative requirements	Legislative requirements are typically reflected in procedures and specifications. Legislation includes: • anti-discrimination • EEO
People from diverse backgrounds	People from diverse backgrounds may include: • any person involved in or related to the work process, such as work colleagues, managers and external personnel
Cultural differences	Cultural difference may include but is not limited to: • race • special needs • disabilities • gender • marital status • sexual preference • age
Examples of cultural differences	Examples of cultural differences may include but are not limited to: • language spoken and related communication style • levels of formality/informality • personal grooming • family obligations • recognised holidays • customs • work ethic • product preferences
Outside organisations	Outside organisations may include but are not limited to: • interpretative services • diplomatic services • local cultural organisations • appropriate government agencies

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RANGE STATEMENT	
	• educational institutions

Unit Sector(s)

Unit sector	Operational

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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FNSORG501A Develop and manage a budget

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to collect and analyse information and apply sound accounting principles to the development and ongoing management of a budget for a small organisation or section of a large organisation. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit may apply to job roles dealing with budgetary control in a range of organisations.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan for and collect information for a budget	1.1. ***Areas*** for which the ***budget*** is being prepared are determined and confirmed with appropriate personnel, and ***data*** required for development of the budget are identified, accessed and analysed 1.2. ***Budget parameters*** are determined with estimates based on research, consultation and negotiating with appropriate personnel 1.3. ***Relevant colleagues*** are provided with the opportunity to contribute to the budget planning process
2. Develop budget	2.1. Budget is drafted based on analysis of all available information in accordance with organisation policy 2.2. ***Income and expenditure*** estimates are identified and supported by reliable information and the draft budget circulated for comment
3. Finalise budget and allocate resources	3.1. Modifications to the budget are agreed and incorporated as required and a final budget provided to the appropriate personnel 3.2. Personnel affected by the budget are informed and its application to the area in which they work in terms of limits and goals, financial management and reporting responsibilities clarified 3.3. Priorities within the budget are agreed and resources allocated

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ELEMENT	PERFORMANCE CRITERIA
4. Monitor and control budget	4.1. Actual income and expenditure are checked against budget at regular intervals with budget reports prepared and presented to appropriate personnel 4.2. Deviations and response to the deviations are identified and appropriate action taken with appropriate personnel advised on budget status
5. Complete financial and statistical reports	5.1. All required ***financial and statistical reports*** are completed accurately within designated timelines 5.2. Recommendations about future financial planning are made as appropriate 5.3. Reports are clearly presented and checked for accuracy and provided to appropriate personnel

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- well-developed communication skills to:
  - establish budget requirements, using questioning and active listening as required
  - liaise with others, share information, listen and understand
  - use language and concepts appropriate to cultural differences
- research and analysis skills to access, interpret and manage budget information
- problem solving skills to address budget development and management issues
- judgement skills for forming recommendations in operational situations
- numeracy and IT skills such as:
  - calculating budget data
  - accessing and using appropriate software such as accounting systems, spreadsheets and databases
- literacy skills for:
  - reading and interpreting documentation from a variety of sources and recording, gathering and consolidating information
  - drafting reports and maintaining records
- organisational skills, including the ability to plan and sequence work

Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE
• basic accounting and financial industry terminology • basic accounting techniques • budgeting techniques and tools • organisation and industry policies and procedures

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to: • collect and accurately interpret relevant data to develop a budget • consult effectively and negotiate outcomes with others on budgetary issues • accurately complete financial and statistical reports related to budgeting.
Context of and specific resources for assessment	Assessment must ensure: • competency is demonstrated in the context of the financial services work environment and conditions specified in the range statement either in a relevant workplace or a closely simulated work environment • access to and the use of a range of common office equipment, technology, software and consumables • access to an integrated financial software system and data.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples, in combination, are appropriate for this unit: • evaluating an integrated activity which combines the elements of competency for the unit or a cluster of related units of competency • verbal or written questioning on underpinning knowledge and skills • setting and reviewing business simulations or scenarios • evaluating samples of work

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EVIDENCE GUIDE	
	• accessing and validating third party reports.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Areas may include:	• an entire organisation • section of an organisation • particular project or other activity.

Budget will normally:	• refer to an expenditure budget but may also include:
	  • an income budget
	  • sales budget
	  • resource allocation and use budget.

Data will include, but is not restricted to, information relating to:	• business plans • historical data • human resource plans • sales and marketing plans.
Budget parameters include:	• availability of finance • organisation policy and directives • sales forecasts • timelines.
Relevant colleagues include:	• all stakeholders who may be expected to need to approve the budget and key stakeholders who will be required to implement the budget.

Income and expenditure includes:	• monetary and financial income and expenditure but may also include:
	  • resources
	  • materials
	  • products

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RANGE STATEMENT	
	• people or hours.
Financial and statistical reports include:	• reports which may be required for: • regulatory compliance • to meet organisation procedure and policy requirements • to give useful information to a relevant person.

Unit Sector(s)

Unit sector	Organisational skills

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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LMTCL2001B Use a sewing machine

Modification History

Not applicable.

Unit Descriptor

Unit descriptor This unit covers the skills and knowledge to use a single sewing machine to align and sew work pieces.

Application of the Unit

Application of the Unit

The unit applies to sewing work using a plain lockstitch machine, zigzag sewing machine or a three thread overlocker to sew straight seams or join flat pieces of stable fabric together.

Sewing techniques may include those where the positioning of the work is controlled by guide bars, sensor lights or other such guiding devices or where there is uncomplicated feeding of the fabric.

Work is conducted according to defined procedures.

Work may be conducted in small to large scale enterprises and may involve individual and team activities.

The application of this unit is according to OHS practices of the enterprise and workplace practices, which may include:

- requirements prescribed by legislation, awards, agreements and conditions of employment
- standard operating procedures
- work instructions
- oral, written and visual communication
- quality practices, including responsibility for maintenance of own work quality and contribution to quality improvement of team or section output
- housekeeping
- tasks related to environmental protection, waste disposal, pollution control, and recycling

This unit requires the application of skills associated with planning and organising to use a sewing machine. Problem solving skills are required to ensure machine is functioning properly and identify any

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performance problems. Communication skills are used to refer to and complete required documentation and report any quality issues. Self management skills are used to ensure safe use of technology and conformance of own work to quality standards.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare work pieces	1.1 Work pieces are received and ***checked***, and any follow-up action is determined. 1.2 Work pieces are laid out in sequence.
2 Prepare for machine use	2.1 Workbench and seating are set up according to ***OHS practices***. 2.2 ***Machines*** are cleaned and checked. 2.3 Records are maintained. 2.4 Machines are ***set up*** and ***adjusted*** according to specifications for work. 2.5 Worn or damaged parts are identified and reported or replaced according to manufacturer specifications.
3 Identify poor machine	3.1 Tension faults are identified. 3.2 Poor thread performance or incorrect thread selection is

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ELEMENT	PERFORMANCE CRITERIA
performance	identified. 3.3 Incorrect foot or needle for sewing is identified. 3.4 Impact of poor machine performance on sewing is identified.
4 Sew work pieces	4.1 Machine is used for ***sewing operations***. 4.2 Pieces are sewn according to product requirements and quality standards. 4.3 Machine is used according to requirements for speed of work. 4.4 Machine speed and work handling are controlled according to type of operations, fabrics and product type. 4.5 OHS practices are followed in operation of machine. 4.6 Action is taken according to OHS practices to prevent accidents and to eliminate risks to personal safety.
5 Assess quality of sewn pieces	5.1 Quality standards are identified. 5.2 Sewn pieces are inspected against quality standards. 5.3 Any faults or pieces that do not meet quality standards are identified and reported. 5.4 Results of quality inspection are recorded. 5.5 Production records or packing slips are completed as required. 5.6 Work is directed to next operation or packing section.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level, required for this unit.

Demonstrates knowledge of:

- garment assembly processes and machines where the positioning of the work may be controlled by guide bars, sensor lights or other such guiding devices or where there is uncomplicated feeding of the fabric
- techniques in using and maintaining a three thread overlocker, zigzag or plain lockstitch sewing machine
- characteristics of stable woven and knitted fabrics and threads such as cotton drill, calico, double knit, rugby knit, poplin
- quality standards and practices
- OHS practices, including hazard identification and control measures
- workplace practices
- recording and reporting practices

Demonstrates skills to:

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This describes the essential skills and knowledge and their level, required for this unit.

- handle, receive and assemble work pieces
- consistently achieve quality and production output requirements
- read, interpret and follow information on work specifications, standard operating procedures and work instructions, and other reference material
- maintain accurate records
- communicate within the workplace
- sequence operations
- meet specifications
- clarify and check task-related information
- carry out work according to OHS practices

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Critical aspects of evidence

Demonstrates skills and knowledge to:

- check work against ticket information or specification sheets
- prepare workstation and work before commencing sewing operations
- apply sewing techniques over a limited range of operations
- operate at least one type of machine for operations where the positioning of the work may be controlled by guide bars, sensor lights or other such guiding devices or where there is uncomplicated feeding of the fabric
- apply OHS practices in work operations
- maintain accurate records

Consistency in performance

Consistently applies skills and knowledge when:

- organising work
- completing tasks according to instructions
- working systematically with attention to detail
- identifying improvements and avoiding damage
- using workplace practices
- using OHS practices
- recording and reporting accidents and incidents
- assessing operational readiness of equipment

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

	• recognising and adapting to cultural differences in the workplace, including modes of behaviour and interactions
Resource implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Context for assessment	Assessment may occur on the job or in an appropriately simulated environment.
Interdependent assessment	This unit may be assessed independently or in combination with other relevant units.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

Legislative/regulatory requirements	All work must comply with relevant Federal and State or Territory legislative or regulatory requirements.
Checked may include	• checking that the work pieces match ticket information • checking that relevant previous operations such as pressing and cutting have been successfully completed
OHS practices	OHS practices include hazard identification and control, risk assessment and implementation of risk reduction measures specific to the tasks described by this unit, and may relate to: • manual handling techniques • standard operating procedures • personal protective equipment • safe materials handling • taking of rest breaks • ergonomic arrangement of workplaces • following marked walkways • safe storage of equipment

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	• housekeeping • reporting accidents and incidents • environmental practices
Machines must include one of the following	• plain lockstitch machine • three thread overlocker • zigzag sewing machine
Set-up includes	• ensuring correct thread, needle size and type, needle guard, tension setting and attachments
Adjusted may include	• checking and replacing worn or damaged needles and attachments (feet)
Sewing operations may include	• aligning and sewing straight seams or joining flat pieces of stable fabric together, for example top stitch, edge stitch, open seams, closed seams, lapped seams

Unit Sector(s)

Sector	Clothing Production

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LMTCL2003B Identify fibres and fabrics

Modification History

Not applicable.

Unit Descriptor

Unit descriptor This unit covers the skills and knowledge to identify fibres and fabrics commonly used in the construction of garments and accessories.

Application of the Unit

Application of the Unit

The unit applies to identifying a wide range of fibres and fabrics used in the clothing industry. Fibres include natural and synthetic, and fabrics include knitted, woven and non-woven.

Work may be conducted in small to large scale enterprises and may involve individual and team activities.

The application of this unit is according to OHS practices of the enterprise and workplace practices, which may include:

- requirements prescribed by legislation, awards, agreements and conditions of employment
- standard operating procedures
- work instructions
- oral, written and visual communication
- quality practices, including responsibility for maintenance of own work quality and contribution to quality improvement of team or section output
- housekeeping
- tasks related to environmental protection, waste disposal, pollution control, and recycling

This unit requires the application of skills associated with problem solving to identify types and characteristics of fibres and fabrics. Learning and self management skills are required to apply knowledge of fibres and fabrics and communication skills are used to explain and describe information about fabric properties.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Identify fibres and fabrics	1.1 ***Fibres*** used in clothing industry are identified. 1.2 ***Methods*** of identifying fibres are identified. 1.3 ***Fabrics*** used in clothing industry are identified. 1.4 Generic and trade names for fibres and fabrics are identified.
2 Describe fabric construction processes	2.1 Fibres used in construction of a variety of fabrics are identified. 2.2 ***Construction processes*** of fabrics are described.
3 Describe qualities of fabrics	3.1 ***Physical qualities*** of fabrics are described. 3.2 ***Visual qualities*** of fabrics are described.
4 Determine uses of fabrics	4.1 Common uses of fabrics are identified. 4.2 Fabrics used in workplace are identified.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level, required for this unit.

Demonstrates knowledge of:

- information sources on fibre and fabric identification
- fabrics used in the workplace
- quality standards and practices
- OHS practices, including hazard identification and control measures
- workplace practices
- recording and reporting practices

Demonstrates skills to:

- identify features of fibres and fabrics
- access information as required
- read, interpret and follow information on work specifications, standard operating procedures and work instructions, and other reference material
- maintain accurate records
- communicate within the workplace
- sequence operations
- meet specifications
- clarify and check task-related information
- carry out work according to OHS practices

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Critical aspects of evidence

Demonstrates skills and knowledge to:

- identify fibres and fabrics
- identify fabric construction processes
- identify fabric qualities
- identify fabric uses within TCF industry

Consistency in performance

Consistently applies skills and knowledge when:

- organising work
- completing tasks according to instructions
- working systematically with attention to detail

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

	• identifying improvements and avoiding damage • using workplace practices • using OHS practices • recording and reporting accidents and incidents • assessing operational readiness of equipment • recognising and adapting to cultural differences in the workplace, including modes of behaviour and interactions
Resource implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Context for assessment	Assessment may occur on the job or in an appropriately simulated environment.
Interdependent assessment	This unit may be assessed independently or in combination with other relevant units.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

Legislative/regulatory requirements	All work must comply with relevant Federal and State or Territory legislative or regulatory requirements.
Fibres may include:	• natural fibres such as cotton, wool, silk, linen • synthetic fibres such as polyamide, polyester, acrylic, lycra, rayon, acetate
Methods may include:	• labelling • visual • handle • acetone • burn test

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Fabrics may include:	• natural and synthetic single yarn fabrics and blends • knitted fabrics including weft knits and warp knits • woven fabrics including plain, twill, satin, dobby, jacquard and pile • non-woven fabrics such as felts, nets, braids, bonded and composite • emerging smart fabrics
Construction processes may include:	• spinning • knitting • weaving • blending • fusing • bonding • finishing
Physical qualities include:	• firmness • softness • handle • weight • grain • gauge • drape • porosity • covering power • count • light penetration
Visual qualities include:	• colours • textures • patterns • right side/wrong side
Fabric characteristics may include:	• bias • stretch • fraying • feel • handle • shrinkage
OHS practices	OHS practices include hazard identification and control, risk assessment and implementation of risk reduction measures specific to the tasks described by this unit, and may relate to: • manual handling techniques • standard operating procedures • personal protective equipment

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- safe materials handling
- taking of rest breaks
- ergonomic arrangement of workplaces
- following marked walkways
- safe storage of equipment
- housekeeping
- reporting accidents and incidents
- environmental practices

Unit Sector(s)

Sector Clothing Production

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LMTCL2006B Press work

Modification History

Not applicable.

Unit Descriptor

Unit descriptor This unit covers the skills and knowledge to press work as part of the garment production process.

Application of the Unit

Application of the Unit

The unit applies to pressing of work as part of the garment production process where the position and handling of work are under the control of the operator and operator skills may contribute to the final appearance and finish of the work.

Work to be pressed may include stable woven and knitted natural and synthetic fabrics.

Work is conducted according to defined procedures.

Work may be conducted in small to large scale enterprises and may involve individual and team activities.

The application of this unit is according to OHS practices of the enterprise and workplace practices, which may include:

- requirements prescribed by legislation, awards, agreements and conditions of employment
- standard operating procedures
- work instructions
- oral, written and visual communication
- quality practices, including responsibility for maintenance of own work quality and contribution to quality improvement of team or section output
- housekeeping
- tasks related to environmental protection, waste disposal, pollution control, and recycling

This unit requires the application of skills associated with planning and organising to press work. Problem solving skills are required to ensure work conforms to requirements and identify any pressing

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problems. Communication skills are used to refer to and complete required documentation. Self management skills are used to ensure safe use of technology and conformance of own work to quality standards.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare workstation	1.1 Work area is set up according to ***OHS practices***.
	1.2 ***Pressing equipment*** is cleaned and checked.
	1.3 ***Routine minor maintenance*** is performed.
	1.4 Work is laid out in correct proximity and sequence.
2 Press work	2.1 Work is collected or received and quality checked, and any follow-up action determined.
	2.2 Faults, spots and marks are identified and appropriate action taken.
	2.3 Appropriate attachments are selected and used.
	2.4 Pressing is sequenced.
	2.5 Work is positioned on pressing equipment according to product requirements.

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ELEMENT	PERFORMANCE CRITERIA
	2.6 Heat, steam, vacuum, pressure and time are applied according to product requirements and fabric specifications.
	2.7 Work is pressed.
	2.8 Equipment and work handling are controlled for variations in work type and construction and pressing requirements.
	2.9 OHS practices are followed.
	2.10 Action is taken according to workplace practices to prevent accidents and to eliminate risks to personal safety.
3 Despatch pressed work	3.1 Pressed work is inspected and compared against workplace pressing standards.
	3.2 Results of inspection of work are recorded.
	3.3 Subsequent action to either reject or correct faulty work is ***reported and recorded***.
	3.4 Preventative action taken to avoid any recurrence of faulty work is recorded.
	3.5 Pressed work is either passed to next operation, hung or packed and directed to required despatch area, despatch storage or packing sections.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level, required for this unit.

Demonstrates knowledge of:

- pressing requirements and characteristics of typical fabrics and other materials used in garment assembly such as woven cottons, denim, single knits, tricot, gabardine, cotton drill, calico, double knit, rugby knit, poplin
- sewing techniques such as pleats, tucks, gathers, darts, hems and how pressing impacts on the finish
- quality standards and practices
- OHS practices, including hazard identification and control measures
- workplace practices
- recording and reporting practices

Demonstrates skills to:

- consistently achieve quality and production output requirements
- read, interpret and follow information on work specifications, standard operating procedures and work instructions, and other reference material
- maintain accurate records

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This describes the essential skills and knowledge and their level, required for this unit.

- communicate within the workplace
- sequence operations
- meet specifications
- clarify and check task-related information
- carry out work according to OHS practices

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Critical aspects of evidence	Demonstrates skills and knowledge to: • check work against work specification or pressing instructions • prepare pressing equipment and work before commencing pressing operations • apply pressing techniques in operations • apply OHS practices in work operations • maintain accurate records
Consistency in performance	Consistently applies skills and knowledge when: • organising work • completing tasks according to instructions • working systematically with attention to detail • identifying improvements and avoiding damage • using workplace practices • using OHS practices • recording and reporting accidents and incidents • assessing operational readiness of equipment • recognising and adapting to cultural differences in the workplace, including modes of behaviour and interactions
Resource implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Context for assessment	Assessment may occur on the job or in an appropriately simulated environment.

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Interdependent assessment	This unit may be assessed independently or in combination with other relevant units.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

Legislative/regulatory requirements	All work must comply with relevant Federal and State or Territory legislative or regulatory requirements.
OHS practices	OHS practices include hazard identification and control, risk assessment and implementation of risk reduction measures specific to the tasks described by this unit, and may relate to: • manual handling techniques • standard operating procedures • personal protective equipment • safe materials handling • taking of rest breaks • ergonomic arrangement of workplaces • following marked walkways • safe storage of equipment • housekeeping • reporting accidents and incidents • environmental practices
Pressing equipment may include:	• irons • presses • industrial steam irons • suction boards • sleeve board • sleeve roll
Routine minor	• washing out or replacing cover and padding

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maintenance may include:	• shaking out rubber mat • brushing and air blowing wire mesh • applying sole-cleaning compounds to hand irons
Reported and recorded	• records may be written, or shown by the attachment of a ticket and reports may be written or verbal.

Unit Sector(s)

Sector	Clothing Production

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LMTCL2007B Lay up, mark and cut uncomplicated fabrics and lays

Modification History

Not applicable.

Unit Descriptor

Unit descriptor This unit covers the skills and knowledge to lay up, mark and cut uncomplicated fabrics and lays.

Application of the Unit

Application of the Unit

The unit applies to situations where single garments or only a couple of layers of fabric are be cut. The marker may be developed directly on the fabric lay or planned separately and applied. Patterns are likely to have uncomplicated shaping and few pieces such as T-shirts, straight or A-line skirts, shift dresses, tracksuits, section crowns, brims, tips, side bands, berets.

Work involves some discretion, initiative and judgement.

Manual or computer aided techniques may be used.

Work is conducted according to defined procedures.

Work may be conducted in small to large scale enterprises and may involve individual and team activities.

The application of this unit is according to OHS practices of the enterprise and workplace practices, which may include:

- requirements prescribed by legislation, awards, agreements and conditions of employment
- standard operating procedures
- work instructions
- oral, written and visual communication
- quality practices, including responsibility for maintenance of own work quality and contribution to quality improvement of team or section output
- housekeeping
- tasks related to environmental protection, waste disposal,

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pollution control, and recycling

This unit requires the application of skills associated with planning and organising to prepare work for layout, marking up and cutting. Problem solving skills are required to ensure fabric conforms to requirements and identify any production problems. Communication skills are used to refer to and complete required documentation. Self management skills are used to ensure safe use of technology and conformance of own work to quality standards.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare workstation	1.1 Workstation, cutting table and seating are set up according to ***OHS practices*** and specifications for work.
	1.2 ***Cutting equipment*** is cleaned, checked and servicing assessed according to manufacturer instructions.
	1.3 Cutting table is prepared to suit correct lay length.
	1.4 ***Lay-up and marking equipment*** is set up and prepared for use.
2 Lay-up fabric	2.1 Lay-up instructions are interpreted.
	2.2 ***Fabric*** is collected and checked.

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ELEMENT	PERFORMANCE CRITERIA
	2.3 Fabric width and quality are checked with lay-up instructions.
	2.4 Fabric is laid up and fabric tension adjusted to match fabric performance.
	2.5 Fabric is checked for faults and required action taken to cut out faults or other appropriate techniques.
3 Draft lay marker	3.1 Cutting order is interpreted for marking requirements such as fabric type, width, quantity and garment sizes.
	3.2 Required pattern pieces are collected and checked manually or by computer.
	3.3 Pattern pieces are manipulated and positioned manually on paper or by computer for most efficient fabric use.
	3.4 Lay marker is drawn up manually or by computer.
	3.5 Lay-up instructions are prepared according to requirements.
4 Copy marker	4.1 Marker is checked against requirements.
	4.2 Marker is copied either manually or by computer.
5 Position marker	5.1 Marker is placed on lay.
	5.2 Marker and lay alignment are checked and appropriate action taken according to job specifications
6 Cut work	6.1 Lay is cut using cutting equipment according to requirements for operation.
	6.2 Cut work is inspected, any faults identified and appropriate action taken to ensure cut pieces meet required quality standards.
	6.3 Preventative action is taken to avoid any recurrence of defective pieces, and is recorded.
	6.4 Performance of cutting equipment is regularly checked for signs of faulty operation, including evidence from inspection of cut pieces, and any required action is taken.
	6.5 OHS practices are followed.
	6.6 Action is taken according to OHS practices to prevent accidents and to eliminate risks to personal safety.
7 Complete work	7.1 Cut work is directed to next operation and work area is cleaned and prepared for next job.
	7.2 Master copy of lay marker is stored in filing drawer or computer as appropriate.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level, required for this unit.

Demonstrates knowledge of:

- characteristics of fabrics and other materials used in garment assembly such as woven fabrics (poplin, drill, flannelette) and knitted fabrics (rugby knit, double knit)
- fabric faults
- pattern identification
- computer operations involved in marker-making, copying and storage
- quality standards and practices
- OHS practices, including hazard identification and control measures
- workplace practices
- recording and reporting practices

Demonstrates skills to:

- draft markers using either manual or computer techniques
- handle, receive and assemble garments
- read, interpret and follow information on work specifications, standard operating procedures and work instructions, and other reference material
- maintain accurate records
- communicate within the workplace
- sequence operations
- meet specifications
- clarify and check task-related information
- carry out work according to OHS practices

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Critical aspects of evidence

Demonstrates skills and knowledge to:

- check work against work specification or cutting order
- set up manual or computer drafting equipment before commencement of marker-making operations
- make markers involving patterns, uncomplicated fabrics and lays, using manual or computer techniques
- prepare cutting table and work before commencing cutting

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

	operations • use cutting techniques • use lay-up techniques • apply workplace OHS practices in work operations • maintain accurate records
Consistency in performance	Consistently applies skills and knowledge when: • organising work • completing tasks according to instructions • working systematically with attention to detail • identifying improvements and avoiding damage • using workplace practices • using OHS practices • recording and reporting accidents and incidents • assessing operational readiness of equipment • recognising and adapting to cultural differences in the workplace, including modes of behaviour and interactions
Resource implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Context for assessment	Assessment may occur on the job or in an appropriately simulated environment.
Interdependent assessment	This unit may be assessed independently or in combination with other relevant units.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

Legislative/regulatory	All work must comply with relevant Federal and State or Territory

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requirements	legislative or regulatory requirements.
OHS practices	OHS practices include hazard identification and control, risk assessment and implementation of risk reduction measures specific to the tasks described by this unit, and may relate to: • manual handling techniques • standard operating procedures • personal protective equipment • safe materials handling • taking of rest breaks • ergonomic arrangement of workplaces • following marked walkways • safe storage of equipment • housekeeping • reporting accidents and incidents • environmental practices
Cutting equipment may include:	• dressmaker's shears • cutting mats • straight-blade cutter
Lay-up and marking equipment may include:	• computers and required software • patterns • fabric • marker card or paper • weights • clamps
Fabric may include:	• woven fabrics such as: • poplin • drill • flannelette • knitted fabrics such as: • rugby knit • double knit • designs such as: • stripes • one-way designs • plaids

Unit Sector(s)

Sector	Clothing Production

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LMTCL2008B Finish garment production

Modification History

Not applicable.

Unit Descriptor

Unit descriptor This unit covers the skills and knowledge to finish completed work in the production of garments or other associated articles.

Application of the Unit

Application of the Unit

The unit applies to finishing operations on garments and other related articles. Finishing operations may include hand or machine tasks such as attaching buttons, cutting loose threads, ironing on transfers, fasteners, attaching tickets and, labels and hemming.

Work performed may require some decision making within defined procedures.

Work may be conducted in small to large scale enterprises and may involve individual and team activities.

The application of this unit is according to OHS practices of the enterprise and workplace practices, which may include:

- requirements prescribed by legislation, awards, agreements and conditions of employment
- standard operating procedures
- work instructions
- oral, written and visual communication
- quality practices, including responsibility for maintenance of own work quality and contribution to quality improvement of team or section output
- housekeeping
- tasks related to environmental protection, waste disposal, pollution control, and recycling

This unit requires the application of skills associated with planning and organising to finish garment production. Problem solving skills are required to ensure work conforms to requirements and identify any production problems. Communication skills are used to refer to

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and complete required documentation. Self management skills are used to ensure safe use of technology and conformance of own work to quality standards.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites LMTCL2003B

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare workstation	1.1 Workbench and seating are set up according to safety standards and ***OHS practices***.
	1.2 ***Components*** are laid out in proximity and sequence according to specifications.
2 Finish work	2.1 ***Finishing operations*** are performed according to customer specifications.
	2.2 Garment or article is checked against specifications to ensure correct sizing and attention to loose threads, and missing buttons and attachments.
	2.3 Faults are identified, reported and returned to appropriate section for repair according to quality standards.
	2.4 Production and other records are completed.
	2.5 OHS practices are followed.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level, required for this unit.

Demonstrates knowledge of:

- characteristics of typical fabrics and other materials used in garment production
- quality standards and practices
- correct sequencing of components
- required finishing procedures
- industry and product processes and equipment
- OHS practices, including hazard identification and control measures
- workplace practices
- recording and reporting practices

Demonstrates skills to:

- set up safe work area
- complete finishing operations
- report and address faults appropriately
- receive, document and transfer information
- read, interpret and follow information on work specifications, standard operating procedures and work instructions, and other reference material
- maintain accurate records
- communicate within the workplace
- sequence operations
- meet specifications
- clarify and check task-related information
- carry out work according to OHS practices

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Critical aspects of evidence

Demonstrates skills and knowledge to:

- attach correct components to garments and articles
- complete finishing operations

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

	• ensure finished garment meets specifications • deal with faults appropriately • maintain accurate records
Consistency in performance	Consistently applies skills and knowledge when: • organising work • completing tasks according to instructions • working systematically with attention to detail • identifying improvements and avoiding damage • using workplace practices • using OHS practices • recording and reporting accidents and incidents • assessing operational readiness of equipment • recognising and adapting to cultural differences in the workplace, including modes of behaviour and interactions
Resource implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Context for assessment	Assessment may occur on the job or in an appropriately simulated environment.
Interdependent assessment	This unit may be assessed independently or in combination with other relevant units.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

All work must comply with relevant Federal and State or Territory legislative or regulatory requirements.

OHS practices	OHS practices include hazard identification and control, risk

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	assessment and implementation of risk reduction measures specific to the tasks described by this unit, and may relate to: • manual handling techniques • standard operating procedures • personal protective equipment • safe materials handling • taking of rest breaks • ergonomic arrangement of workplaces • following marked walkways • safe storage of equipment • housekeeping • reporting accidents and incidents • environmental practices
Components may include	• tags • trims • garments • buttons • fasteners • labels • belt and button loops
Finishing operations may include	• trimming loose threads • checking • spotting • sorting • hand or machine sewing buttons or fasteners • hand or machine sewing hems • securing lining • sewing and cutting buttonholes • attaching accessories or trims • attaching tickets and labels • bundling

Unit Sector(s)

Sector	Clothing Production

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LMTGN2008B Coordinate work of team or section

Modification History

Not applicable.

Unit Descriptor

Unit descriptor This unit covers the skills and knowledge to coordinate work of a team or section.

Application of the Unit

Application of the Unit

The unit applies to coordination and monitoring of the work of a team or section.

Work requires discretion, initiative and judgement on the job in own work. Work may be conducted in a variety of environments, such as operational workplace activities, restricted space, and hazardous, controlled or exposed conditions.

Work may be conducted in small to large scale enterprises and may involve individual and team activities.

The application of this unit is according to OHS practices of the enterprise and workplace practices, which may include:

- requirements prescribed by legislation, awards, agreements and conditions of employment
- standard operating procedures
- work instructions
- oral, written and visual communication
- quality practices, including responsibility for maintenance of own work quality and contribution to quality improvement of team or section output
- housekeeping
- tasks related to environmental protection, waste disposal, pollution control and recycling

Team work and communication skills are central to this unit to ensure team performance meets production and organisational requirements. This unit also requires planning and organising skills and an ability to apply problem solving strategies to identify and

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address team problems.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate work schedules	1.1 Tasks, jobs and work priorities are confirmed with supervisor or manager. 1.2 Tasks are assigned to team, section and individuals. 1.3 Priority of tasks is communicated to team, section or individuals. 1.4 Materials are organised to meet work requirements.
2 Monitor performance and quality	2.1 Required work standard is communicated to team, section or individuals to ensure understanding of task requirements. 2.2 Standard of performance, including quality standards, of team, section or individuals, is monitored to ensure achievement of outcomes and is reported. 2.3 Instruction and support are provided, as required, in order to achieve standards and outcomes. 2.4 Proposals for improvements to work processes, efficiency and organisation are communicated and reported to ***appropriate personnel***.

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ELEMENT	PERFORMANCE CRITERIA
3 Monitor application of OHS	3.1 Implementation of OHS and environmental standards and procedures are monitored to achieve safety standards and requirements in the workplace. 3.2 Proposals for prevention or correction of problems are identified and communicated and reported to appropriate personnel, according to ***OHS practices***.
4 Communicate with work team, section, individuals	4.1 All information affecting work, including OHS and quality standards is explained logically in an easily understood manner to individuals and teams, as required. 4.2 Feedback from team, section members and individuals is sought to assist in effective operation of team or section.
5 Report work of team or section	5.1 Reports and documentation on team or section performance and outcomes are provided to line supervisor and management, as required. 5.2 Team or section performance and outcomes, which impact on operations of other sections, are communicated effectively and promptly, as required, to appropriate personnel.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit

Demonstrates knowledge of:

- production and workflow system in the team
- factors and constraints that impact on effective workflow
- effective work methods to achieve production objectives and timelines
- methods for monitoring and coordinating the use of resources
- quality assurance standards and practices
- OHS practices, including hazard identification and control measures
- workplace practices
- recording and reporting practices

Demonstrates skills to:

- prioritise resources (machines, staff, materials and production processes)
- allocate work to team or section members
- identify and report problems with workflow
- maintain and update monitoring procedures
- analyse and record results according to workplace practices

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REQUIRED SKILLS AND KNOWLEDGE

- read, interpret and follow information on work specifications, standard operating procedures and work instructions, and other reference material
- maintain accurate records
- communicate within the workplace
- sequence operations
- meet specifications
- clarify and check task-related information
- carry out work according to OHS practices

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Critical aspects of evidence

Demonstrates skills and knowledge to:

- organise work tasks, work processes and staff
- meet efficiency standards
- advise appropriate ways of correcting non-compliance and inefficiencies
- apply techniques to monitor work
- apply OHS practices in work operations
- maintain accurate records

Consistency in performance

Consistently applies skills and knowledge when:

- organising work
- completing tasks according to instructions
- working systematically with attention to detail
- identifying improvements and avoiding damage
- using workplace practices
- using OHS practices
- recording and reporting accidents and incidents
- assessing operational readiness of equipment
- recognising and adapting to cultural differences in the workplace, including modes of behaviour and interactions

Resource implications

Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Context for assessment	Assessment may occur on the job or in an appropriately simulated environment.
Interdependent assessment	This unit may be assessed independently or in combination with other relevant units.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

Legislative/regulatory requirements	All work must comply with relevant Federal and State or Territory legislative or regulatory requirements.
Appropriate personnel may include:	• line supervisor or manager • team or section leaders • supervisors or managers in other sections • technical specialists
OHS practices	OHS practices include hazard identification and control, risk assessment and implementation of risk reduction measures specific to the tasks described by this unit, and may relate to: • manual handling techniques • standard operating procedures • personal protective equipment • safe materials handling • taking of rest breaks • ergonomic arrangement of workplaces • following marked walkways • safe storage of equipment • housekeeping • reporting accidents and incidents • environmental practices

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Unit Sector(s)

Sector All

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LMTGN4002A Participate in product engineering

Modification History

Not applicable.

Unit Descriptor

Unit descriptor This unit covers the skills and knowledge required to participate in product engineering in a textiles, clothing and footwear (TCF) enterprise.

Application of the Unit

Application of the Unit This unit applies to participating in product engineering in a TCF workplace where judgement may be required in planning and selecting appropriate processes or procedures for self and others. Work may be conducted in a variety of environments, including operational workplace activities, restricted space, hazardous, controlled or exposed conditions.

TCF production areas may include:

- textile production
- clothing production
- footwear production
- early stage wool processing
- cotton ginning
- leather production
- millinery
- canvas and sails production
- laundry operations
- dry cleaning operations

Product engineering may occur in relation to repetitive production runs, short runs and quick changes and can relate to fabrics, fibres, yarns, design varieties, weaves, dyes, finishes, etc.

Work may be conducted in small to large scale enterprises and may involve individual and team activities. Work is performed within defined procedures under direct supervision.

The unit is applied according to OHS and workplace practices of the

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enterprise, which may include:

- requirements prescribed by legislation, awards, agreements and conditions of employment
- standard operating procedures
- work instructions
- oral, written and visual communication
- quality practices, including responsibility for maintenance of own work quality and contribution to quality improvement of team/section output
- housekeeping
- tasks related to environmental protection, waste disposal, pollution control and recycling

This unit requires the application of skills associated with communication to interpret production specifications, calculate costs, maintain records and prepare reports. Initiative and enterprise, planning and organising and problem solving are required to examine production options and determine required variations to specifications, processes and schedules. This unit also requires an ability to learn and apply new information. Self management skills are used to ensure work meets quality and work standards.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

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Elements and Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA
1 Identify and confirm specifications	1.1 Sample material or product is examined to confirm structure 1.2 Detail of structure or composition is documented, where required, to assist in production planning
2 Identify options for production	2.1 Evaluation of material or product structure is conducted to identify options for production 2.2 Options are assessed to determine most effective and efficient ***method of production***, ensuring highest quality and yield from raw materials, and ease of production 2.3 Options and recommendations are documented in accordance with workplace practices and ***OHS practices***
3 Identify potential machine or production changes	3.1 Existing resources, machines, production techniques and scheduling arrangements are examined in relation to the production requirements 3.2 Any potential requirements for change are identified and documented in accordance with workplace practices
4 Prepare ***cost*** estimates	4.1 Material requirements and economic batch sizes are identified 4.2 Labour hours, times and other statistics required are identified and estimates made 4.3 Available machine hours are determined and estimates made, where required 4.4 Overall costs are estimated and documented in accordance with workplace practices
5 Maintain records	5.1 Production planning records are maintained and reports prepared, where necessary, in accordance with workplace practices

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit

Demonstrates knowledge of:

- machines and their capabilities
- quality assurance processes; production processes and software
- products produced by the workplace and material or fabric structure (techniques)
- work and workplace organisation systems
- safety and environmental aspects of relevant workplace activities
- OHS practices, including hazard identification and control measures

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REQUIRED SKILLS AND KNOWLEDGE

- quality practices
- workplace practices
- recording and reporting practices

Demonstrates skills to:

- determine structure and composition of material or product
- make calculations, interpret and use data from various sources
- read, interpret and follow information on work specifications, standard operating procedures and work instructions and other reference material
- maintain accurate records
- communicate within the workplace
- sequence operations
- meet specifications
- clarify and check task-related information
- carry our work according to OHS practices

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Critical aspects of evidence to be considered

Demonstratesskills and knowledge to:

- confirm specifications
- assess options for method of production
- establish potential machine and production changes
- estimate costs
- apply OHS practices in production operations
- maintain accurate records

Consistency in performance

Consistentlyapplies skills and knowledge when:

- organising work
- completing tasks
- identifying improvements
- using workplace practices
- using OHS practices
- recording and reporting accidents and incidents
- assessing operational readiness of equipment used and work processes

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

	• recognising and adapting to cultural differences in the workplace, including modes of behaviour and interactions • completing work systematically with attention to detail without damage to goods and equipment
Resource implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Context for assessment	Assessment may occur on the job or in an appropriately simulated environment.
Interdependent Assessment	This unit may be assessed independently or in combination with other relevant units.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

Legislative/regulatory requirements	All work must comply with relevant Federal and State or Territory legislative or regulatory requirements.
Method of production may include:	• JIT • VAM • quick response • quality circles, • team processes • benchmarking
Cost estimating may include:	• written bill of labour, order of work or plant sample
OHS practices	OHS practices must include hazard identification and control, risk assessment and implementation of risk reduction measures specific to the tasks described by this unit, and may include:

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- manual handling techniques
- standard operating procedures
- personal protective equipment
- safe materials handling
- taking of rest breaks
- ergonomic arrangement of workplaces
- following marked walkways
- safe storage of equipment
- housekeeping
- reporting accidents and incidents
- other OHS practices relevant to the job and enterprise

Unit Sector(s)

Sector All

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LMTGN4016A Contribute to the development of products or processes

Modification History

Not applicable.

Unit Descriptor

Unit descriptor This unit covers the skills and knowledge required to contribute to developing products or processes within the workplace.

Application of the Unit

Application of the Unit

This unit applies to activities contributing to development of products or processes within the enterprise. It includes conducting trials to establish conformance to requirements. Judgement may be required in planning and selecting appropriate processes or procedures for self and others.

Work may be conducted in restricted spaces or exposed conditions or controlled or open environments

Work responsibilities will vary in scope according to:

- size of the workplace
- range of designs or products
- specialisation in the workplace
- workplace quality standards

Work may be conducted in small to large scale enterprises and may involve individual and team activities.

This unit is applied according to OHS and workplace practices of the enterprise, which may include:

- requirements prescribed by legislation, awards, agreements and conditions of employment
- standard operating procedures
- work instructions
- oral, written and visual communication
- quality practices, including responsibility for maintenance of own work quality and contribution to quality improvement of

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team/section output
- housekeeping
- tasks related to environmental protection, waste disposal, pollution control and recycling

This unit requires the application of skills associated with planning and organising the development of products or process for production. This unit also requires an ability to work with others in the team to test and asses the quality and feasibility of designs and make adjustments or modifications to specifications. Initiative, enterprise and problem solving will be used to assist in feasibility studies and develop specifications. Learning skills will be used to gather and apply new information.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA
1 Interpret provisional specifications	1.1 Provisional specifications are identified
	1.2 Specifications are interpreted, in consultation with others, where required
2 Participate in feasibility studies	2.1 Requirements for feasibility study are identified, in conjunction with others, as required

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ELEMENTS	PERFORMANCE CRITERIA
	2.2 Assistance is provided in studies to assess feasibility of design and development through sampling, trial run production, consideration of machine or equipment capabilities, availability of resources, required quality and cost
3 Assist in developing or engineering product	3.1 Product or process specifications are interpreted and preliminary specifications are developed from ***feasibility study***
	3.2 Specifications are used to develop or engineer the product
	3.3 Raw materials are checked or selected to meet requirements
	3.4 Machine or equipment or skill availability are determined against requirements
4 ***Conduct trials***	4.1 Requirements for trial are confirmed and clarified, where necessary, to establish procedures and parameters
	4.2 Organisation and liaison with production area occurs, where required
	4.3 Trials are assessed in accordance with the established procedures
5 Analyse and interpret results	5.1 Results of the trials are analysed to determine performance and acceptability for production
	5.2 Analysis is interpreted to determine performance and acceptability for production
6 Report results and maintain records	6.1 Reports are prepared
	6.2 Records are maintained, where required,

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit

Demonstrates knowledge of:

- industry and product processes
- product and process development procedures
- machine or equipment, resource and skill capabilities within the workplace
- feasibility study procedures
- safety and environmental aspects of relevant workplace activities
- reporting processes
- OHS practices, including hazard identification and control measures
- quality practices
- workplace practices
- recording and reporting practices

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REQUIRED SKILLS AND KNOWLEDGE

Demonstrates skills to:

- carry out sampling
- check and select raw materials
- interpret specifications
- establish availability of machines
- determine availability of required skills and personnel
- select, interpret and evaluate procedures or processes
- read, interpret and follow information on work specifications, , standard operating procedures and work instructions and other reference material
- maintain accurate records
- communicate within the workplace
- sequence operations
- meet specifications
- clarify and check task-related information
- carry out work according to OHS practices

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Critical aspects of evidence to be considered

Demonstrates skills and knowledge to:

- conduct feasibility studies
- interpret and develop specifications
- use specifications appropriately
- organise and conduct trials
- assess results of trials

Consistency in performance

Consistently applies skills and knowledge when:

- organising work
- completing tasks
- identifying improvements
- using workplace practices
- using OHS practices
- recording and reporting accidents and incidents
- assessing operational readiness of equipment used and work processes

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

	• recognising and adapting to cultural differences in the workplace, including modes of behaviour and interactions • completing work systematically with attention to detail without damage to goods and equipment
Resource implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Context for assessment	Assessment may occur on the job or in an appropriately simulated environment.
Interdependent assessment	This unit may be assessed independently or in combination with other relevant units.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

Legislative/regulatory requirements	All work must comply with relevant Federal and State or Territory legislative or regulatory requirements.
Feasibility studies may include:	• sampling • trial run production • consideration of machine capabilities • availability of resources • required quality • cost
Conducting trials may relate:	• confirmation and clarification of requirements • liaison with production area • allocating work • reviewing and evaluating processes and products • performing trials • interpreting data

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- analysing results

OHS practices

OHS practices must include hazard identification and control, risk assessment and implementation of risk reduction measures specific to the tasks described by this unit, and may include:

- manual handling techniques
- standard operating procedures
- personal protective equipment
- safe materials handling
- taking of rest breaks
- ergonomic arrangement of workplaces
- following marked walkways
- safe storage of equipment
- housekeeping
- reporting accidents and incidents
- other OHS practices relevant to the job and enterprise

Unit Sector(s)

Sector

All

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LMTGN5004A Manage installation and commissioning of equipment and systems

Modification History

Not applicable.

Unit Descriptor

Unit descriptor This unit covers the skills and knowledge required to manage the installation and commissioning of equipment and systems used in a textiles, clothing and footwear (TCF) workplace.

Application of the Unit

Application of the Unit

This unit applies to the management of the installation and commissioning of equipment and systems used in a TCF workplace where significant judgement is required in planning, technical or supervisory activities related to operations or processes. The work may involve individual and team related activities, and can include liaison with specialist technicians or contractors. Work may be conducted in a large scale production or small business situation in a TCF sector

The unit may relate to on-shore or off-shore applications; it would include all local requirements and may include establishing a new production line.

The application of this unit is according to OHS practices of the enterprise and workplace practices, which may include:

- requirements prescribed by legislation, awards, agreements and conditions of employment
- standard operating procedures
- work instructions
- oral, written and visual communication
- quality practices, including responsibility for maintenance of own work quality and contribution to quality improvement of team or section output
- housekeeping
- tasks related to environmental protection, waste disposal, pollution control and recycling

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This unit requires the application of skills associated with communication to interpret specifications and technical information and prepare work-plans, budgets and contracts relating to equipment and systems. Knowledge of the technology is required to make assessments about commissioning processes and report and document information. Planning and organising, initiative and enterprise and problem solving are required to coordinate, problem solve and monitor installation processes and achievement of performance targets.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare work plan and specification document	1.1 Items to be included in work plan and specification document are identified and confirmed 1.2 Work plan for installation and commissioning of ***equipment and systems*** is drawn up, including management and reporting procedures 1.3 Specification document is prepared according to workplace and/or manufacturer procedures
2 Coordinate and	2.1 Contract arrangements for the installation and commissioning of

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ELEMENT	PERFORMANCE CRITERIA
monitor contract arrangements	equipment/systems, including all legal, insurance and safety requirements, are coordinated in accordance with workplace and/or legislative procedures
	2.2 Contract arrangements are monitored to ensure compliance with requirements and variations dealt with according to agreed strategy
3 Manage schedules and budgets	3.1 Information is gathered to establish adherence to schedule and budget forecasts
	3.2 Deviation from performance targets is monitored and corrective action taken, if and where necessary
	3.3 Scheduling and budgeting processes are assessed to determine whether variations or alternative plans are indicated
4 Administer legal, environmental and OHS requirements	4.1 Legal, environmental and OHS requirements related to installation and commissioning of equipment/systems are defined
	4.2 Monitoring of the process is assessed to ensure compliance
5 Assess and report on work completion	5.1 Completed work is assessed to confirm all specifications have been incorporated
	5.2 Report on work completed is prepared in accordance with ***workplace practices***
6 Maintain records	6.1 Records are maintained of installation and commissioning activities in accordance with workplace practices

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level

Demonstrates knowledge of:

- appropriate installation and commissioning procedures
- OHS considerations and environmental factors
- contract requirements
- safety and environmental aspects of relevant enterprise activities
- workplace practices and reporting/recording processes
- relevant regulatory requirements and codes of practice
- relevant OHS legislation, regulatory requirements and codes of practice
- carry out work in accordance with OHS practices
- hazard identification and control measures associated with managing installation and commissioning of equipment and systems

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REQUIRED SKILLS AND KNOWLEDGE

Demonstrates skills to:

- monitor contract arrangements, scheduling and budgets
- manage the application of technical skills by other personnel
- communicate effectively within the workplace, including liaising with other departments
- establish or interpret procedures, where required
- determine report requirements and present information in appropriate formats
- read, interpret and follow information on job instructions, specifications, standard operating procedures, patterns, charts, tickets, order forms and other applicable reference material
- sequence operations
- clarify and check task related information

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Critical aspects of evidence to be considered

Assessment must confirm appropriate knowledge and skills to:

- develop and prepare work plan and specification documents
- organise and monitor contract arrangements
- assess scheduling and budgeting procedures
- implement legal, environmental and OHS obligations/requirements
- ensure completed work meets specifications
- maintain accurate records

Consistency in performance

Applies underpinning knowledge and skills when:

- organising work
- managing activities and personnel
- completing tasks
- identifying improvements
- applying safety precautions relevant to the task
- assessing operational capability of specified equipment used and work processes
- shows evidence of application of relevant workplace practices including:
- hazard policies and procedures including codes of practice

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

	• job procedures and work instructions • quality procedures (where existing) • waste, pollution and recycling management processes • action taken promptly, accidents and incidents reported in accordance with statutory requirements and workplace practices • recognises and adapts appropriately to cultural differences in the workplace, including modes of behaviour and interactions among staff and others • work completed systematically with attention to detail without damage to goods, equipment or personnel
Resource implications	• access to real or appropriately simulated situations involving the management of the installation and commissioning of equipment and systems used in a TCF context • this includes real or simulated work areas, materials, equipment, and information on work specifications, manufacturer's instructions, relevant safety procedures and regulations, quality standards, workplace practices and customer requirements
Context for assessment	Assessment may occur on the job or in an appropriately simulated environment
Interdependent assessment	This unit does not necessarily need to be assessed in conjunction with other units and can be assessed independently

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

Legislative/regulatory requirements	All work must comply with relevant Federal and State or Territory legislative or regulatory requirements, organisation insurance requirements, OHS legislation, manual handling procedures and relevant health regulations.

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Equipment and systems may include:	• microprocessor or computer control • production and facility equipment used within the enterprise
Workplace practices may include:	• workplace practices relating to managing installation and commissioning of equipment and systems • conditions of service, legislation and industrial agreements including workplace agreements and awards and Federal or State/Territory legislation • standard work practices • reporting verbally or in writing • oral, written or visual communication • being responsible for the maintenance of own work quality and contributing to the quality improvement of team or section output, where necessary • safety, environmental, housekeeping and quality practices as specified by machine and equipment manufacturers, regulatory authorities and the organisation
Workplace OHS practices may include:	• use of personal protective wear and equipment • safe materials handling practices • taking of rest breaks • ergonomic arrangement of workplaces • following marked walkways • storage of equipment • workstation housekeeping • cleaning of equipment • workers' compensation legislation

Unit Sector(s)

Sector All

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MEM03001B Perform manual production assembly

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers assembling components and/or sub-assemblies in a production environment and testing the components and/or sub-assemblies to ensure compliance with specifications.

Application of the Unit

Application of the unit	This unit applies to production-orientated assembly operations that are essentially manual in nature and do not require complex adjustments. This unit should not be selected when Unit MEM18055B (Dismantle, replace and assemble engineering components) has already been selected. Where the selection and use of tools is required as part of the assembly process, see Unit MEM18001C (Use hand tools) and Unit MEM18002B (Use power tools/hand held operations) as appropriate. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Read and understand job sheets	1.1. Job sheets and instructions are understood and followed correctly.
2. Select assembly equipment and components	2.1. Assembly equipment is selected according to instructions or job sheets and used to standard operating procedures. 2.2. Components/sub-assemblies are obtained and arranged for assembly. 2.3. Equipment/tools are used in a safe manner.
3. Assemble components	3.1. Assembly is produced following correct sequence of operations, using selected equipment to standard operating procedures. 3.2. Production data is recorded/input to standard

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ELEMENT	PERFORMANCE CRITERIA
	operating procedures.
4. Perform tests	4.1. Assembly is tested/checked for compliance to job sheet requirements, following standard operating procedures as required.
5. Protect assembly from damage	5.1. Components and/or assemblies are handled and stored safely, in a manner least likely to cause damage.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • following job instructions and standard operating procedures • selecting and using assembly tools, components and sub-assemblies • entering routine and familiar information onto proformas and other standard workplace forms • following oral instruction
Required knowledge
Look for evidence that confirms knowledge of: • application and use of assembly tools and equipment • sequence in which the assemblies are to be performed • storage location of the component/sub-assemblies • required tests and checks • required action for non-conformance • potential damage through the use of inappropriate handling and/or unsafe storage procedures • use and application of personal protective equipment • safe work practices and procedures • hazards and control measures associated with manual production assembly

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to assemble components and/or sub-assemblies in a production environment and test the components and/or sub-assemblies to ensure compliance with specifications.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing manual production assembly or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Components/sub-assemblies	Parts that make up the sub-assembly and components
Recorded/input	By means of production schedules, job sheets, checklists
Tested/checked	Carried out according to specification of assembled product

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Assembly

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MEM03003B Perform sheet and plate assembly

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	The unit covers assembling prefabricated/formed components using a range of joining techniques.

Application of the Unit

Application of the unit	This unit applies to production assembly of pre-fabricated/formed components. Applications of this unit may include manufacture of white goods, appliances, electrical cabinets, metal furniture, cladding and shelving, box trailer bodies, ductwork and other sheet and plate assemblies. Where production welding skills are required, refer to Unit MEM05013C (Perform manual production welding). Where soft soldering is required, Unit MEM05003B (Perform soft soldering) should be selected. Where brazing and/or silver soldering is required, Unit MEM05006B (Perform brazing and/or silver soldering) should be selected. Where measurement skills are required, refer to Unit MEM12023A (Perform engineering measurements). **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Read and understand job sheets	1.1. Job sheets/instruction are correctly interpreted and followed.
2. Select and use sheet and plate assembly equipment	2.1. Assembly equipment is selected in accordance with instructions on job sheet. 2.2. Equipment is used in a safe manner according to standard operating procedures.
3. Assemble fabrications	3.1. Products to be assembled are verified against specifications. 3.2. Assembly is produced following correct sequence of operations. 3.3. Assemblies/fabrications are joined to specification

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ELEMENT	PERFORMANCE CRITERIA
	using specified joining techniques. 3.4. Assembly is tested/checked for compliance with job requirements using standard operating procedures.
4. Protect assembly from damage	4.1. Assemblies/fabrications are handled and stored according to standard operating procedures and in a safe manner least likely to cause damage.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading, interpreting and following written job sheets, instructions, standard operating procedures and other applicable reference documents • checking and clarifying routine familiar information • selecting and using specified assembly equipment and tools • following sequence of operations • joining the components/fabrications correctly and safely using appropriate techniques • testing and checking assembled products for compliance with specifications • handling and storing components, fabrications and/or assemblies • checking for conformance to specifications • following oral instructions
Required knowledge
Look for evidence that confirms knowledge of: • the importance of following the sequence of operations • application and function of assembly equipment • safety precautions and operating characteristics of assembly equipment and tools • application and limitations of different joining techniques • surface preparation and joining techniques • assembly tests/checks • safe handling and storage procedures applicable to components, fabrications and/or assemblies

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REQUIRED SKILLS AND KNOWLEDGE
• effects of inappropriate handling and storage procedures • hazards and control measures associated with sheet and plate assembly • use and application of personal protective equipment • safe work practices and procedures for sheet and plate assembly

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to assemble prefabricated/formed components using a variety of joining techniques. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge,s and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with sheet and plate assembly or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct

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EVIDENCE GUIDE	
	observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Assembly equipment	Jigs, fixtures and other appropriate tools
Joining techniques	Seaming, bonding, riveting, welding etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units	

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Co-requisite units		

Competency field

Competency field	Assembly

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MEM03004B Perform electronic/electrical assembly (production)

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers identifying and assembling electronic/electrical components and testing assembled components for conformance to job sheets/specifications.

Application of the Unit

Application of the unit	This unit applies to assembly of electronic/electrical components or equipment to predetermined specifications and following predetermined procedures. This unit covers the use of automatic wave soldering machines. If soldering skills are required, then Unit MEM05001B (Perform manual soldering/desoldering - electrical/electronic components) or Unit MEM05002B (Perform high reliability soldering and desoldering) should be selected. If measurement skills are required, then Unit MEM12002B (Perform electrical/electronic measurement) should also be selected. Where the selection and use of tools is required as part of the assembly process, see Units MEM18001C (Use hand tools) and MEM18002B (Use power tools/hand held operations) as appropriate. **Band**: **A** **Unit Weight**: **8**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Read and understand job sheets.	1.1. Job sheets and instructions are understood and followed correctly.
2. Select assembly equipment	2.1. Assembly equipment is selected and used in accordance with instructions or job sheets to standard operating procedures. 2.2. Equipment is used in a safe manner.
3. Identify electronic/electrical	3.1. Common name, appearance, colour of electronic

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ELEMENT	PERFORMANCE CRITERIA
components	and electrical components are identified. 3.2. Polarity indicators are identified on components.
4. Assemble components	4.1. Correct components are selected by code/colour or other identification methods. 4.2. Components/devices are prepared for soldering or other termination methods. 4.3. Cables are connected to a variety of plug and socket combinations as required. 4.4. Components are safely handled and stored using appropriate anti-static handling procedures and techniques in accordance with standard operating procedures. 4.5. Assembly is produced following correct sequence of operations.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading, interpreting and following assembly job sheets, instructions and standard operating procedures • selecting appropriate tools and equipment • using tools and equipment • selecting electronic and electrical components by name, colour and appearance • preparing components/devices for soldering and termination • connecting cables to plugs/sockets • handling and storing components safely • applying anti-static handling procedures and techniques • checking work for conformance to specification • completing production records and reports • following oral instructions • using hand and power tools dedicated to the assembly process • identifying components by name, appearance and colour • entering routine and familiar information onto proforma and standard workplace

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REQUIRED SKILLS AND KNOWLEDGE
forms
Required knowledge
Look for evidence that confirms knowledge of: • assembly equipment and its application • hazards associated with the misuse of tools and equipment • polarity indicators on common electronic and electrical components • consequences of connecting electronic and electrical components with incorrect polarity • termination methods • preparation requirements for components/devices to be soldered • preparation requirements for components/devices to be terminated using non-soldering techniques • connection requirements of a variety of plugs and sockets • anti-static procedures and techniques • safe handling and storage requirements of electrical and electronic components • consequences of not following the correct sequence of operations • specifications against which the assembly is to be checked/tested • test/check procedures • data recording requirements

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform electrical/electronic assembly (production).
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and to be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for	This unit may be assessed on the job, off the job or a

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EVIDENCE GUIDE	
assessment	combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with electronic/electrical assembly (production) or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Assembly

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MEM03006B Set assembly stations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers setting up, adjusting and testing assembly stations according to defined procedures.

Application of the Unit

Application of the unit	This unit applies to setting a range of assembly stations. It also includes routine maintenance of the equipment. Assembly stations may be used for a range of operations and processes. For setting automated assembly processes, Unit MEM07040A (Set multistage integrated processes) should be selected. Machine setting skills are covered by Unit MEM07003B (Perform machine setting (routine) and Unit MEM07004B (Perform machine setting (complex). Where measurement skills are required, then Unit MEM12023A (Perform engineering measurements) should also be considered. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM03001B	Perform manual production assembly
	MEM18001C	Use hand tools
Path 2	MEM03003B	Perform sheet and plate assembly
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
Path 3	MEM03004B	Perform electronic/electrical assembly (production)
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify job	1.1. Setting requirements are correctly identified from

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ELEMENT	PERFORMANCE CRITERIA
requirements	job sheets/instructions.
2. Select and use a range of hand tools and equipment	2.1. Hand tools and equipment for setting assembly stations are used in a safe manner, according to instructions, standard operating procedures and any legislative requirements.
3. Set assembly stations	3.1. Assembly stations are set up for a range of processes and operations according to defined procedures. 3.2. Safe work practices are observed and implemented. 3.3. Assembly stations are adjusted to specifications and operational requirements. 3.4. Assembly stations are tested for correct operation.
4. Maintain equipment	4.1. Routine maintenance is carried out to standard operating procedures. 4.2. Worn or damaged components are identified and changed.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading and interpreting routine information on written job instructions, specifications and standard operating procedures. May include drawings for setting assembly stations
- following oral instructions
- testing and checking assembly station and outputs
- identifying worn and/or damaged components

Required knowledge

Look for evidence that confirms knowledge of:

- procedures to be followed in setting up assembly stations
- safety hazards associated with the assembly station and/or its setting up
- specifications applicable to the assembly station
- effect of various adjustments that can be made to the assembly station

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REQUIRED SKILLS AND KNOWLEDGE
• routine maintenance requirements • effect of worn or damaged components on the operational requirements and specifications of the assembly station • use and application of personal protective equipment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to set, adjust and test assembly stations. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication materials handling, recording and reporting associated with setting, adjusting and testing assembly stations or other units requiring the exercise of the skills and knowledge covered by this unit.

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EVIDENCE GUIDE	
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Job sheets/instructions	Verbal and written job instructions, specifications, standard operating procedures and assembly drawings within the scope of this unit
Assembly station	May be used for operations such as riveting, pressing, screwing, tensioning etc. and processes such as testing, gluing, identification, numbering or simple hot stamping etc.
Set up	Ensuring that appropriate jigs, fixtures, die sets, stores and tooling etc. are in place as required to meet the production order or schedules
Processes and operations	Riveting, pressing, screwing, tensioning, testing, gluing, identification, numbering or simple hot

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RANGE STATEMENT	
	stamping of components and assemblies

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Assembly

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MEM05005B Carry out mechanical cutting

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers setting up and operating a range of mechanical cutting and holing equipment.

Application of the Unit

Application of the unit	This unit applies to sawing, shearing, cropping and/or holing and includes setting up and operating a range of equipment. Examples of machines that could be covered include guillotines, croppers, cold saws, band saws, automatic saws etc. Typical applications of this unit may include cutting for manufacture, production cutting and cutting of materials selected from stores in a maintenance environment. This unit does not cover hand or hand held power tools used for cutting e.g. circular saws, nibblers and side grinder. These skills are covered by Unit MEM18001C (Use hand tools) and Unit MEM18002B (Use power tools/hand held operations). This unit does not include the skills required for operational maintenance of the equipment used; these skills are covered by Unit MEM07001B (Perform operational maintenance of machines/equipment). For repair and welding of band saw blades where blade repair unit is not attached to the machine, refer to Unit MEM05013C (Perform manual production welding). **Band**: **A** **Unit Weight**: **2**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine job requirements	1.1. Job requirements and specifications are determined from job sheets and/or instructions. 1.2. Appropriate method/machine is selected to meet specifications. 1.3. Machine is loaded and adjusted for operation consistent with standard operating procedures.
2. Select/set up machine tooling	2.1. Tooling is selected to match job requirements. 2.2. Tooling is correctly installed using standard

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ELEMENT	PERFORMANCE CRITERIA
	operating procedures. 2.3. Machine is set up and adjusted using standard operating procedures.
3. Operate mechanical cutting machine	3.1. Appropriate stops and guards are set and adjusted as required. 3.2. Material is secured and correctly positioned using measuring equipment as necessary. 3.3. Machine is started and stopped safely to standard operating procedures. 3.4. Machine is operated to cut/hole material to specifications using standard operating procedures.
4. Check material for conformance to specification	4.1. Material is checked against specification. Machine and/or tooling is adjusted as required and in process adjustments carried out as necessary. 4.2. Material is cut and/or holed to within workplace tolerances. 4.3. Material is used in most economical way. 4.4. Codes and standards are observed.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • loading and adjusting cutting machines • selecting machines and tooling • installing cutting tool • setting up and adjusting cutting machine • securing and correctly positioning materials • cutting and holing materials • applying relevant codes and standards • reading and interpreting routine information on written job instructions, specifications and standard operating procedures • following oral instruction • measuring materials to specified workplace tolerances and within the machine

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REQUIRED SKILLS AND KNOWLEDGE
range • clarifying routine task-related information
Required knowledge
Look for evidence that confirms knowledge of: • the characteristics of cutting methods and machines • effect of materials on the machine tooling, tooling defects and adjustments • effect of adjustments on the dimensions of the cut material • applicable tolerances • methods of marking out materials to ensure minimum wastage • any applicable industry standards, national/Australian standards, NOHSC guides, State/Territory regulatory codes of practice/standard • use and application of personal protective equipment for mechanical cutting • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to carry out mechanical cutting on a range of machines. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this

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EVIDENCE GUIDE	
	unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication materials handling, recording and reporting associated with carrying out mechanical cutting or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Machine	Guillotines, croppers, cold saws, band saws, automatic saws etc.
Tooling	Tooling to suit guillotines, croppers, cold saws, band saws, automatic saws etc.

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RANGE STATEMENT	
Stops and guards	All safety equipment/stops/guards on guillotines, croppers, cold saws, band saws, automatic saws etc.
Material	Ferrous and non-ferrous metals and non-metallic products
Codes and standards	Legislative and regulatory requirements, industry and enterprise codes and standards

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05007C Perform manual heating and thermal cutting

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing manual heating, thermal cutting and gouging including the assembly and disassembly and operation of the equipment on a range of materials (ferrous, non-ferrous and non-metallic) using a variety of methods.

Application of the Unit

Application of the unit	This unit applies to manual, straight line cutting standards. Manual or automatic processes are used to cut and heat to specifications. Cutting may include flame gouging by hand. All work is carried out to legislative and regulatory requirements. Predetermined standards of quality and safety are observed and work is carried out following standard operating procedures. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Assemble/disassemble plant and equipment	1.1. Accessories and equipment are correctly selected and assembled for manual heating and thermal cutting.
2. Operate heating and thermal cutting equipment	2.1. Cutting process and/or procedure appropriate for material is selected. 2.2. All safety procedures are observed. 2.3. Equipment start-up procedures are followed correctly to standard operating procedures. 2.4. Equipment adjustments are made correctly using standard operating procedures. 2.5. Appropriate cutting allowances are made. 2.6. Material is used in the most economical way. 2.7. Defects are identified and corrective action is taken to standard operating procedures. 2.8. Material is heated and cut to specification.

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ELEMENT	PERFORMANCE CRITERIA
	2.9. Shape/size/length is to accepted workplace standards.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • performing pre-start checks • safely starting equipment • following standard operating procedures • adjusting equipment to operating specifications • making cutting allowances • economising material and minimising wastage • identifying cutting defects and taking corrective action • heating and cutting materials to specifications • reading and interpreting routine information on written job instructions, specifications and standard operating procedures. May include drawings • following oral instructions • performing measurements needed to meet the requirements of this unit • entering routine and familiar information onto proformas and standard workplace forms
Required knowledge
Look for evidence that confirms knowledge of: • cutting processes appropriate to various materials • heating and cutting specifications • procedures for heating and cutting • the tools, equipment and techniques for heating and cutting • assembling procedures for equipment and accessories • hazards and control measures associated with manual heating and thermal cutting • use and application of personal protective clothing and equipment • equipment pre-checks and operation • procedures for adjusting heating and cutting equipment

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REQUIRED SKILLS AND KNOWLEDGE
• cutting allowances and reasons for applying them • procedures for minimising waste material • reasons for minimising waste material • cutting defects and their causes • procedures for correcting cutting defects • tools, equipment and techniques required to correct cutting defects • use and application of personal protective equipment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform manual heating and thermal cutting.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with manual heating/thermal cutting or other units requiring the exercise of the skills and knowledge covered by this unit.

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EVIDENCE GUIDE	
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questions should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Cutting	Use of hand held and self-propelled straight line cutters
Process	Fuel gas, oxy fuel gas and air fuel gas
Material	Various thicknesses and types including ferrous, non-ferrous and non-metallic materials

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05012C Perform routine manual metal arc welding

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing the materials and carrying out routine manual metal arc welding (MMAW).

Application of the Unit

Application of the unit	This unit applies in a maintenance or manufacturing environment where the welding is not required to meet an Australian standard or equivalent. Fillet and butt welds would typically be performed on low carbon/mild steels. Where welding is required to AS 1554 General Purpose or equivalent codes, occupational health and safety regulations and/or licensing requirements, Unit MEM05015D (Weld using manual metal arc welding process) should be selected. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Refer to Application of the Unit

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify weld requirements	1.1. Weld requirements are identified from job instructions. 1.2. Location of welds is identified in accordance with standard operating procedures and job specifications.
2. Prepare materials for welding	2.1. Materials are cleaned and prepared ready for welding.
3. Prepare equipment for welding	3.1. Welding equipment is set up correctly. 3.2. Correct electrodes are selected to suit application and settings.
4. Perform routine welding using MMAW	4.1. Safe welding practices are applied. 4.2. Materials are welded to job requirements. 4.3. Welds are cleaned in accordance with standard operating procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • preparing materials and electrodes • setting up welding equipment • welding with MMAW • reading and interpreting routine information on written job instructions, specifications and standard operating procedures • performing measurements for joint preparation and routine MMAW
Required knowledge
Look for evidence that confirms knowledge of: • material and equipment preparation • properties and characteristics of materials and consumables • weld characteristics • equipment set-up and settings • MMAW processes and properties • post-welding treatments • safe welding practices • use and application of personal protective equipment

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare materials and carry out routine manual metal arc welding (MMAW).

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, then appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing routine manual metal arc welding or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Materials	Low and mild carbon steel or similar
Prepared	Cleaning, setting up jigs, fixtures, clamps, joint preparation
Welding equipment	Welding leads, welding machines, electrode holder etc.
Cleaned	Slag and spatter, cleaning, using files and grinders

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05050B Perform routine gas metal arc welding

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing materials and routine gas metal arc welding (GMAW).

Application of the Unit

Application of the unit	This unit applies in a maintenance or manufacturing environment where the weld quality is not required to meet an Australian Standard or equivalent. Fillet and butt welds would typically be performed on low carbon/mild steels. Where welding is required to meet Australian Standard 1554 General Purpose or equivalent codes, occupational health and safety regulations and/or licensing requirements, Unit MEM05017D (Weld using gas metal arc welding process) should be selected. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Refer to Application of the Unit

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify weld requirements	1.1. Weld requirements are identified from job instructions. 1.2. Locations of welds are identified in according to standard operating procedures and job specifications.
2. Prepare materials for welding	2.1. Materials are cleaned and prepared ready for welding.
3. Prepare equipment for welding	3.1. Welding equipment is set up correctly. 3.2. Settings and consumables are selected to suit application.
4. Perform routine welding using GMAW	4.1. Safe welding practices are applied. 4.2. Materials are welded to job requirements. 4.3. Welds are cleaned to standard operating procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • preparing materials • setting up welding equipment • welding with GMAW • reading and interpreting routine information on written job instructions, specifications and standard operating procedures • following oral instruction • using measurement skills relating to joint preparation and routine GMAW
Required knowledge
Look for evidence that confirms knowledge of: • different current and voltage settings, gas flow rates wire diameters, wire feed speed and other variables to suit typical situations. • material and equipment preparation • properties and characteristics of materials and consumables • equipment and equipment settings • fuel gas properties and applications • post-welding treatments • weld characteristics • safe welding practices • use and application of personal protective equipment for routine GMAW

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must

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EVIDENCE GUIDE	
	be able to perform routine gas metal arc welding (GMAW).
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with preparing the materials and carrying out routine gas metal arc welding or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Materials	Mild and low carbon steel
Prepared	Preheating, setting up jigs, fixtures, clamps, joint preparation
Equipment	Hoses, welding leads, gas shrouds, gas regulators, liners, contact tips
Consumables	Filler wire, shielding gas
Cleaned	Slag and spatter

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Fabrication

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MEM05051A Select welding processes

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers identifying material properties and selecting appropriate welding processes to achieve safe and effective welding outcomes.

Application of the Unit

Application of the unit	This unit applies to all types of welding. It includes the identification of properties and characteristics of all commonly used metals, and selection of appropriate welding techniques to ensure integrity of materials is maintained during welding processes. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify properties of commonly used metals	1.1. Materials to be welded are identified. 1.2. Characteristics and properties of commonly used materials are identified. 1.3. Uses and purposes of commonly used materials are identified. 1.4. Basic metallurgical characteristics are considered.
2. Identify and provide for welding contingencies	2.1. Information relevant to welding processes is sourced as required. 2.2. Potential contingencies are identified and solutions are considered.
3. Identify appropriate welding processes	3.1. Welding processes are identified and selected to achieve specified outcomes with selected metals. 3.2. Effects of welding processes on materials are identified. 3.3. Distortion prevention measures are identified. 3.4. Alternative joining methods for job are identified and assessed for relevancy.
4. Identify cleaning and preparation requirements	4.1. Processes for cleaning and preparing metals are identified. 4.2. Role of contaminants in welding flaws is explained. 4.3. Safety requirements for chemicals and other

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ELEMENT	PERFORMANCE CRITERIA
	materials are identified and utilised in accordance with manufacturers' specifications and legislative requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • planning and sequencing operations • checking and clarifying task-related information
Required knowledge
Look for evidence that confirms knowledge of: • hazards and control measures associated with welding practices, including housekeeping • safe work practices and procedures • properties and characteristics of commonly used metals and materials • basic metallurgy principles • information resources • chemical content of fumes emitted by welding processes • uses and purposes of various metals • distortion prevention measures for various metals

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the

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EVIDENCE GUIDE	
performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to select welding processes.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with selecting welding processes or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Characteristics	Tensile strength, grade, heat resistance, density
Properties	Physical properties, flammable limits, melting point
Basic metallurgical characteristics	Alloys and grades of metals and different types of electrodes
Information	Steel suppliers handbooks, welding company materials, standard operating procedures, safety documentation

Welding processes	• Fusion:
	  • electric arc welding
	  • gas (oxy-fuel) welding
	  • thermit welding
	• Pressure welding processes:
	  • resistance welding
	  • fire or forge welding
	  • friction welding
	  • explosive welding
	• Low temperature processes:
	  • soldering
	  • brazing
	• Other:
	  • ultrasonic welding
	  • electron beam welding

Effects	Thermal expansion, heat affected zones, fume emissions, altered density, distortion
Distortion prevention measures	Heat treatments, consolidations
Processes for cleaning and weld preparation	Etching, grinding, arc gouging, thermal cutting, chemical additives, anti-corrosion treatments

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RANGE STATEMENT	
Safety requirements	• Dry and ventilated areas • In accordance with workplace procedures • Location away from heat risks • Location away from incompatible substances • Requirements for hazardous substances • Adequate signage and labelling • Appropriate sealing • Routine inspections • Emergency procedures • Regulatory notification requirements

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05052A Apply safe welding practices

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers identifying risks associated with welding operations and implementing hazard reduction practices.

Application of the Unit

Application of the unit	This unit applies to gas and electric arc welding. It includes the identification of risks associated with welding all commonly used metals and implementation of techniques used to reduce or eliminate welding hazards. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Access and interpret OH&S information	1.1. OH&S information is obtained and interpreted. 1.2. Relevant OH&S legislation is identified. 1.3. Work related safety information is obtained and interpreted.
2. Identify risks associated with welding	2.1. Pollutants formed by welding processes are identified. 2.2. Occupational diseases and injuries which may be associated with welding are identified. 2.3. Factors associated with increased risk are identified. 2.4. Exposure levels for pollutants are identified. 2.5. Risks and potential health effects associated with specific metals are identified. 2.6. Risks and potential health effects associated with gases in welding are identified. 2.7. Other hazards of welding are identified.
3. Reduce risks associated with welding	3.1. Manual handling techniques are used. 3.2. Personal protective equipment is used correctly. 3.3. Procedures to control hazards are implemented. 3.4. Workplace safety procedures are implemented. 3.5. Workplace safety non-compliances are reported in accordance with workplace procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • sourcing and interpreting safety-related information and Material Safety Data Sheets (MSDS) • planning and sequencing operations • identifying workplace risks and nonconformances • reporting workplace risks and nonconformances • checking and clarifying task-related information
Required knowledge
Look for evidence that confirms knowledge of: • characteristics and properties of common metals and welding materials • effect of gas and electrical welding operations on metals • hazards and control measures associated with gas and electrical welding, including housekeeping • welding safety practices and procedures • effect of various treatments on a range of commonly used metals • use and application of personal protective equipment

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply safe welding practices.
Critical aspects for assessment and	Assessors must be satisfied that the candidate can

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EVIDENCE GUIDE	
evidence required to demonstrate competency in this unit	competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying safe welding practices or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different

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RANGE STATEMENT	
work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
OH&S information	• National Occupational Health and Safety Commission guidelines • Organisational OH&S practices and procedures manuals • Australian/New Zealand and ISO standards • Company risk management policy • Codes of practice • Australian dangerous goods legislation • Trade practices • Occupational Health and Safety reporting requirements • Weld procedures
Work related safety information	• Standard operating procedures • Material safety data sheets (MSDSs) • Job sheets • Emergency procedures • Safety standards and procedures
Pollutants	• Nitrogen oxides • Ozone • Metal fumes etc. • Lead oxide • Silicon oxide • Calcium fluoride • Calcium oxide • Magnesium oxide • Sodium oxide • Potassium oxides • Carbon dioxide • Organics • Iron • Manganese • Calcium carbonate • Zirconium oxide • Titanium oxide • Hexavalent chromium

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RANGE STATEMENT	
Occupational diseases and injuries	• Eye injuries • Skin damage • Respiratory irritations • Chronic effects • Allergies
Factors	• Gas leakage from cylinders • Type of consumable and metals used • Type of welding processes • Type of electrodes • Welding current • Voltage and amperage • Ventilation • Contamination • Interaction of chemicals • Exposure levels • Flammability
Exposure levels	• Time Weighted Average • Short Term Exposure Limit (STEL) • Maximum Allowable Concentration (MAC) or Threshold Limit Value - Ceiling (TLV-C) • Skin Notation
Specific metals	• Aluminium • Antimony • Arsenic • Beryllium • Boron • Cadmium • Chromium • Copper • Cobalt • Iron • Lead • Lithium • Magnesium • Manganese • Mercury • Molybdenum • Nickel • Platinum • Selenium

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RANGE STATEMENT	
	• Silver • Thorium • Tin • Titanium • Tungsten • Vanadium • Zinc • Zirconium
Gases	• Acetylene • Argon • Carbon dioxide • Carbon monoxide • Helium • Nitrogen oxides • Ozone • Phosgene • Phosphine • Stibine
Other hazards	• Fluxes • Electro-magnetic radiation • Electric shock • Sparks • Spatter • Contaminated and coated metals • Gas cylinder and electrical hazards • Confined spaces • Noise • Chemical exposure • Solvents • Musculoskeletal, back and overuse injuries • Vibration • Dusts • Heat stress • Ultraviolet radiation • Airborne pollutants • Flammable gases • Infrared radiation • Thermal damage
Manual handling techniques	• Housekeeping practices • Lifting weight limits

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RANGE STATEMENT	
	• Appropriate storage • Use of lifting devices • Appropriate training • Hazardous materials storage standards and procedures
Personal protective equipment	• Respirators • Ear muffs • Protective clothing • Gloves • Boots • Helmets • Eye protection • Face shields
Procedures to control hazards	• Substituting hazardous materials with safer materials • Changing workplace design to eliminate hazards • Modifying work practices to reduce exposure • Using personal protective equipment • Using adequate and appropriate ventilation
Workplace safety measures	• Shielding requirements • Ventilation • General and diluted • Local exhaustion • Use of personal protective equipment • Checking equipment condition • Equipment maintenance • Correct operation of equipment • Correct voltage and electrical connections • Good posture • Fire safety, plant and equipment isolation • Communications with appropriate personnel

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM06003C Carry out heat treatment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers carrying out heat treatment of materials using a variety of equipment.

Application of the Unit

Application of the unit	This unit applies to the heat treatment of ferrous and non-ferrous metals using a variety of equipment. Examples of applications include cast metal products, machine tooling, and forged and machined components. Simple heat treatment applications like annealing and/or heat/quench processes undertaken as incidental to trade work (e.g. toolmaking) are covered by Unit MEM06007B (Perform basic incidental heat/quenching, tempering and annealing). **Band**: **A** **Unit Weight**: **6**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine requirements of job	1.1. Job requirements are determined from engineering drawings, job sheet, or verbal instructions from metallurgist or supervisor.
2. Select heat treatment equipment	2.1. Appropriate equipment is selected for the required heat treatment.
3. Set up equipment	3.1. Equipment is set up according to standard operating procedures and manufacturers' instructions.
4. Work safely with hot metals	4.1. Safety clothing and personal protective equipment is used correctly according to standard operating procedures. 4.2. Emergency procedures are demonstrated according to approved safety instructions. 4.3. Safety signs and symbols are identified and understood. 4.4. Equipment is used according to specifications and

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ELEMENT	PERFORMANCE CRITERIA
	standard operating procedures.
5. Heat treat material	5.1. Material is treated to achieve required result and may include preparation processes. 5.2. Material is piece or batch loaded and unloaded using equipment appropriate to the situation, according to standard operating procedures. 5.3. Correct temperature is maintained according to standard operating procedures.
6. Identify hazardous conditions	6.1. Hazards are identified and hazard control measures are implemented to maintain a safe work environment.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- setting up and operating heat treatment equipment
- applying heat treatment
- safely loading furnace(s)

Required knowledge

Look for evidence that confirms knowledge of:

- work specifications
- material characteristics
- heat treatment applications, equipment and processes
- emergency procedures
- material preparation, quenching, preheating requirements
- material condition during heat treating process
- batch and/or piece loading of furnaces
- safe loading of furnaces
- hazards and control measures associated with heat treatment, including housekeeping
- use and application of personal protective equipment

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REQUIRED SKILLS AND KNOWLEDGE
• safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to work safely with hot metals to carry out heat treatment of materials.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing heat treatment or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond

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EVIDENCE GUIDE	
	those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Equipment	Gas, electric, oil fired furnaces, vacuum furnace, induction heating, kilns, heated baths, salt baths, specialised tongs/tools and lifting equipment
Material	Plain carbon steels, alloy steels, non-ferrous
Preparation processes	Coatings and packings; preheating; soaking; quenching; tempering; annealing; normalising; carburizing; sintering

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Forging

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MEM07001B Perform operational maintenance of machines/equipment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers carrying out programmed safety and maintenance checks on machines/equipment.

Application of the Unit

Application of the unit	This unit mainly applies in a manufacturing setting, where routine programmed operational maintenance to machines/equipment is required. It is not intended to be used where higher level maintenance activities are performed. Machines/equipment range includes manual, semi-automatic and automatic machines of a stand-alone continuous production or process nature. This unit should not be selected when any of the following are selected: Unit MEM18055B (Dismantle, replace and assemble engineering components), Unit MEM18006C (Repair and fit engineering components), Unit MEM07005C (Perform general machining). **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Undertake programmed safety and maintenance checks	1.1. Checks are undertaken safely and to prescribed procedure. 1.2. Status/report is recorded on proforma or reported orally.
2. Undertake programmed maintenance	2.1. Removal/replacement of consumable components is undertaken to prescribed procedure and instructions are followed. 2.2. Fluids and lubricants are replaced and/or topped up to prescribed schedule.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • undertaking programmed safety and maintenance checks • undertaking programmed operational maintenance • entering routine and familiar information onto proformas and standard workplace forms • following routine information on written procedures • following oral instructions • orally reporting routine information
Required knowledge
Look for evidence that confirms knowledge of: • programmed maintenance and safety check procedures for the specified machine/equipment • recording/reporting requirements • safe work practices and procedures • hazards and control measures associated with operational maintenance of machines/equipment

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform operational maintenance of machines/equipment. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required

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EVIDENCE GUIDE	
	knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with operational maintenance of machines/equipment or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating

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RANGE STATEMENT	
conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Machines/equipment	Manual, semi-automatic and automatic machines of a stand-alone continuous production or process nature
Checks	Programmed safety and maintenance checks Adjustments of a limited nature including safety guards, stops, wear pads and tool holders, nipping up glands and adjustment of scrapers and aprons
Consumable components	Air filters, oil wipers, grease containers, tool tips, indicator globes, fluids and lubricants, guides and limit switch actuators

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Machine and process operations

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MEM07015B Set computer controlled machines/processes

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers mounting work holding fixtures/devices/tools, conducting pre-start checks, setting numerical and computer controlled machines, instructing the operator and replacing worn or damaged tooling.

Application of the Unit

Application of the unit	The unit applies to the setting of any computer controlled machines/processes. Applications may include NC/CNC machines and industrial robots. Work is performed to established processes, practices, specifications and instructions as appropriate. Technical difficulties are resolved in consultation with appropriate technical advisers. For setting non-computer controlled machines or processes, refer to Unit MEM07003B (Perform machine setting [routine]). **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM07024B	Operate and monitor machine/process
	MEM07028B	Operate computer controlled machine/processes
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM07024B	Operate and monitor machine/process
Path 2	MEM07005C	Perform general machining
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Obtain job instructions	1.1. Job sheets or equivalent instructions are understood and correctly followed.
2. Mount work holding fixtures/devices/tools	2.1. Machine is prepared to accept work holding fixtures/devices/tools. 2.2. Preset tooling is mounted as required into machine/equipment. 2.3. Work holding fixtures/devices are set on machine as required using standard operating procedures. 2.4. Tool offset or datum settings are identified/verified against job sheet using standard operating procedures. 2.5. Program is loaded, selected and verified in accordance with job instructions.
3. Conduct pre-start checks	3.1. Pre-start checks are undertaken to standard operating procedures. 3.2. Correct safety procedures are observed and all safety equipment is checked for correct operation.
4. Set machine	4.1. Machine is set/adjusted to meet operational requirements and specifications. 4.2. Production samples are checked for compliance with specifications using standard operating procedures.
5. Instruct machine operator	5.1. Operator is instructed, if necessary, ensuring that all safety procedures and devices are in place.
6. Replace worn/damaged tooling	6.1. Where appropriate, preset tools are replaced, tool offsets are adjusted or other corrective action is taken using standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in:

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REQUIRED SKILLS AND KNOWLEDGE

- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying task related information
- mounting work holding fixtures/devices/tooling
- mounting preset tooling
- verifying tool offsets and/or datum settings against job sheets or instructions
- loading and verifying programs
- conducting pre-start checks
- following safety procedures
- checking safety features and safety equipment for correct operation
- performing numerical operations and calculations/formulae within the scope of this unit
- setting and adjusting machines
- measuring and verifying first-off samples
- instructing machine operators on the sequence of operations
- identifying worn or damaged tooling and taking appropriate corrective action

Required knowledge

Look for evidence that confirms knowledge of:

- work holding fixtures/devices/tools and preset tooling for different machines/processes
- procedures for mounting work holding fixtures/devices/tools
- location of work holding fixtures/devices/tools relative to the machine datum or zero
- reasons for establishing tool offsets
- the purpose of datum settings
- the source(s) of information on tool offsets and datum settings
- procedures to locate and load programs
- procedures for verifying loaded programs
- pre-start checks
- safety features of the machine/process
- the purpose and function of safety features and/or safety equipment
- machine/process setting procedures
- machine operating procedures
- adjustments that can be made to the machine/process
- the effect of adjustments on machine and operational specifications
- product or part specifications in relation to the machining process
- measuring devices for checking parts or products

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REQUIRED SKILLS AND KNOWLEDGE
• examples of worn or damaged tooling • the effects of worn or damaged tooling • the corrective action for worn or damaged tooling • hazards and control measures associated with numerical and computer controlled machines, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to set computer controlled machines/processes. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with setting computer controlled machines/processes or other units requiring the exercise of the skills and knowledge covered by this unit.

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EVIDENCE GUIDE	
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Machine and process operations

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MEM07024B Operate and monitor machine/process

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers obtaining the job instruction, conducting the pre-start checks, and operating and monitoring the machine or process.

Application of the Unit

Application of the unit	This unit applies to a range of production operations or continuous processes. The work is performed in accordance with clear step-by-step instructions and procedures documented on job sheets or similar process instruction documents. Operational adjustments to the machine or process by the operator are made using external controls. Basic operation (excluding setting and tool adjustments) of CNC machines is covered by this unit. Where production packaging and labelling of the finished goods or product is required, Unit MEM11006B (Perform production packaging) should be considered. This unit should not be selected with any of the following units unless the skills of this unit are being applied to an additional and different type of machine and or process: Unit MEM04001B (Operate melting furnaces), Unit MEM04002B (Perform gravity die casting), Unit MEM04003B (Operate pressure die casting machine), Unit MEM04006B (Operate sand moulding and core making machines), Unit MEM06001B (Perform hand forging), Unit MEM06002B (Perform hammer forging), Unit MEM08001B (Perform wire, jig and barrel load/unload work), Unit MEM08004B (Finish work using wet, dry and vapour deposition methods), Unit MEM08008B (Operate and control surface finishing waste treatment process)

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	Band: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Obtain job	1.1. Job sheets or equivalent instructions are interpreted

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ELEMENT	PERFORMANCE CRITERIA
instructions	correctly.
2. Conduct pre-start checks	2.1. Pre-start checks are undertaken to standard operating procedure. 2.2. Safety procedures are observed and all safety equipment is checked for correct operation.
3. Operate machine/process	3.1. Machine/process is started up safely and correctly in accordance with standard operating procedures. 3.2. Machine/process is operated in accordance with job instructions or standard operating procedures. 3.3. Components/feed stock are loaded and maintained consistent with production requirements. 3.4. Machine/process output is unloaded safely to standard operating procedures, as required. 3.5. Machine/process output is handled and stored in a manner not likely to cause damage, as required. 3.6. Production data is recorded to standard operating procedures.
4. Monitor machine/process	4.1. Machine/process is monitored for safe and correct operation, deviations and faults are identified and reported in accordance with standard operating procedures. 4.2. Emergency procedures are understood and followed in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • following job sheets, standard operating procedures and other applicable workplace forms • manual handling • following oral instructions • entering routine and familiar information onto proformas and standard workplace forms

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REQUIRED SKILLS AND KNOWLEDGE
• orally reporting routine information • identifying deviations and faults in machine operation/process
Required knowledge
Look for evidence that confirms knowledge of: • pre-start checks • machine/process start-up and unloading procedures • component/feed stock levels to ensure continuous process • production recording and reporting requirements • types of product fault/deviations • consequences of improper handling and storing of finished work • procedures to be followed in emergency situations • use and application of personal protective equipment • safe work practices and procedures • hazards and control measures associated with operating and monitoring machine/process

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to obtain the job instruction, conduct the pre-start checks, and operate and monitor the machine or process.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic

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EVIDENCE GUIDE	
	workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with operating and monitoring machine/process or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Pre-start checks	Condition of machine before operation
Machine/process	Machines and processes used in pressing, punching, plastic moulding, extruding, bending,

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RANGE STATEMENT	
	joining, rolling, forming, drawing, metal removal, pickling, cylinder filling, printing, painting etc.
Production data	Production schedules, job sheets, checklists

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Machine and process operations

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MEM07028B Operate computer controlled machines/processes

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers obtaining the job instructions, conducting the pre-start checks, and operating and monitoring the computer controlled machine or process.

Application of the Unit

Application of the unit	This unit applies to a range of NC, CNC and robot operated machines or processes in a production environment. Work is performed to established processes, practices, specifications and instructions as appropriate. Technical difficulties are resolved in consultation with appropriate technical advisers. An appropriate level of measurement skill should be selected with this unit. Where it is required to use tools, then Unit MEM18001C (Use hand tools) should also be selected. Where basic operation excludes setting and tool adjustment skills, then Unit MEM07024B (Operate and monitor machine/process) should be selected. When operational maintenance is required, unit MEM07001B (Perform operational maintenance of machines/equipment) should be selected. **Band**: **A** **Unit Weight**: **2**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM07024B	Operate and monitor machine/process

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Obtain job instructions	1.1. Job sheets or equivalent instructions are understood and correctly followed.
2. Conduct pre-start checks	2.1. Pre-start checks are undertaken to standard operating procedures. 2.2. Correct safety procedures are observed and all safety equipment is checked for correct operation.
3. Operate computer	3.1. Installed computer controlled program is selected

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ELEMENT	PERFORMANCE CRITERIA
controlled machine/process	and verified in accordance with job instructions. 3.2. Computer controlled machine is operated safely to product specifications using standard operating procedures. 3.3. Machine malfunctions are identified and reported. 3.4. Production samples are checked for compliance to specification using standard operating procedures.
4. Monitor machine/process	4.1. Tool wear is monitored and, where appropriate, preset tools are replaced, tool offsets are identified in computer controlled program and adjusted, or other corrective action is taken using standard operating procedures. 4.2. Product deviation from specification is reported in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying task related information
- making pre-start checks
- checking safety equipment and guards for correct operation
- following safety procedures
- selecting and verifying the correct computer controlled program
- operating the computer controlled machine
- identifying and reporting machine malfunctions
- checking parts/products for conformance to specification
- monitoring the machine or process for signs of tool wear
- taking corrective action
- reporting part or product deviations from specification

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge
Look for evidence that confirms knowledge of: • pre-start checks • safety equipment and features associated with the machine/process • safety procedures associated with the machine/process • procedures for accessing computer controlled programs installed in the machine controller • procedures for verifying the correct computer controlled program • computer controlled machine operating procedures • typical machine malfunctions • procedures for reporting machine malfunctions • measuring instruments/techniques • examples of tool wear and the effect on product or part specifications • procedures to be followed once tool wear has been detected • replacing preset tools • adjustments to tool offsets • the effect of adjustments on part or product specifications • procedures for reporting product or part deviations • hazards and control measures associated with operating computer controlled machines/processes, including housekeeping • safe workplace practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to operate computer controlled machine/processes. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required

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EVIDENCE GUIDE	
	knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with operating computer controlled machine/processes or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating

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RANGE STATEMENT	
conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Machine and process operations

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MEM08002C Pre-treat work for subsequent surface coating

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers pre-treating common ferrous and non-ferrous work.

Application of the Unit

Application of the unit	This unit applies to pre-treatment of common ferrous and non-ferrous work for finishing by a wide variety of processes, such as wet coating, powder coating, electroplating, anodising, electroless plating, electrophoretic coating and hot dip metallising. In the pre-treatment process, adjustments to apparatus/equipment/controls include temperature settings, current/voltage and solution compositions. This unit should not be selected if Unit MEM08003C (Perform electroplating operations) has already been selected. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units		
Path 1	MEM13003B	Work safely with industrial chemicals and materials

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify job material	1.1. Common metals, alloys and non-metals can be identified.
2. Identify job surface condition	2.1. Common surface soils and conditions can be identified.
3. Perform pre-treatment processes in correct sequence	3.1. Pre-treatment processes are carried out to standard operating procedures. 3.2. Pre-treatment process parameters are monitored to ensure they remain within specified limits.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading and following routine and familiar information on standard operating procedures
- recognising common surface soils and conditions from given samples
- carrying out appropriate pre-treatment processes
- monitoring and maintaining the pre-treatment process parameters within specified limits
- following verbal instructions
- orally reporting routine information

Required knowledge

Look for evidence that confirms knowledge of:

- characteristics of common metals, alloys and non-metals and procedures and techniques for identifying them
- common surface soils and conditions
- procedures for identifying the type(s) of soil on surfaces to be finished
- simple tests that can be used to assist in identifying surface soils and conditions
- pre-treatment processes applicable to a range of materials, surface soils and conditions
- procedures for carrying out pre-treatment processes
- parameters and procedures for monitoring pre-treatment processes
- hazards and control measures associated with pre-treatment
- use and application of personal protective equipment
- safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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EVIDENCE GUIDE	
Overview of assessment	A person who demonstrates competency in this unit must be able to pre-treat common ferrous and non-ferrous materials. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with pre-treating common ferrous and non-ferrous materials or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Common metals	Steel, copper, brass, zinc, cast iron, stainless steel
Surface soils and conditions	Oils, greases, drawing compounds, cutting lubricants, buffing lubricants, rust and scale
Pre-treatment processes	Solvent degreasing, alkaline cleaning, pickling, acid dipping
Process parameters	Temperature, time, currents, solution concentrate

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Surface finishing

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MEM08007B Control surface finish production and finished product quality

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers applying the principles of quality assurance, applying research and quality information to the production process, and performing quality tests to industry standards.

Application of the Unit

Application of the unit	This unit applies to lifting and moving material manually and by basic mechanical handling devices/aids in a wide range of environments. Analyses are confined to the use of basic instruments such as pH meters, hydrometers, stalagmometers, laboratory balances. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Apply principles of quality assurance	1.1. Quality assurance standards are applied to enterprise specifications.
2. Apply research or quality data to production process	2.1. Liaison is undertaken with in-house/external control laboratories. 2.2. Data is correctly interpreted and process changes are recommended. 2.3. Process changes are effectively implemented. 2.4. Laboratory/research data is used to determine and make changes/corrections to processes.
3. Perform quality tests to industry standards	3.1. Quality testing is performed as required to standard operating procedures and industry standards.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading and interpreting quality assurance standards, test data other applicable reference documents
- liaising between the production section and the control laboratory
- checking and clarifying information
- using effective communication skills and terminology for conveying and discussing task-related information
- determining and recommending process changes
- using tests to calculate process parameters on the basis of test and production data collected
- using appropriate tests, testing equipment and techniques to test the surface coating for conformance with specification

Required knowledge

Look for evidence that confirms knowledge of:

- enterprise and industry quality assurance standards that apply to surface finish production and product quality
- the role of the control laboratory and procedures for liaising with internal/external control laboratories
- surface finish specifications
- characteristics of deviations of test/production data and their causes
- the procedures, calculations and formulae for determining process parameters
- the effect of varying process parameters on the specification of the surface finish
- surface coating tests and the procedures, equipment and techniques necessary to carry out those tests
- hazards and control measures within the scope of this unit
- use and application of personal protective equipment
- safe work practices and procedures
- manual handling techniques

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to control surface finish production and finished product quality.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with controlling surface finish production and finished product quality or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for	

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EVIDENCE GUIDE	
assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Quality testing	Tests for hardness, adhesion, deposit stress, thickness, corrosion, resistance and appearance by checking coating thickness, appearance, corrosion resistance, adhesions, deposit stress

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Surface finishing

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MEM08011B Prepare surfaces using solvents and/or mechanical means

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers selecting the appropriate preparation process, selecting and setting up the equipment, undertaking blasting or application of solvents as required, and checking the finished surface.

Application of the Unit

Application of the unit	This unit applies to surface preparation in new surfaces and in restoration work. Application of surface preparations can apply to metal and non-metal materials. Work is undertaken autonomously or as part of a team environment to established predetermined processes, practices and specifications including environmental requirements. All work and work practices are undertaken to regulatory and legislative requirements. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units		
Path 1	MEM13003B	Work safely with industrial chemicals and materials
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine job requirements	1.1. Surface preparation requirements are determined from job sheet, instructions or other predetermined specifications in accordance with standard operating procedures. 1.2. Where required, appropriate solvent and solvent application are selected to meet job specification. 1.3. Where required, appropriate mechanical equipment is selected to meet job specification. 1.4. Work site is prepared for surface cleaning activities.
2. Set up equipment	2.1. Appropriate equipment and any required

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ELEMENT	PERFORMANCE CRITERIA
	consumables are assembled, set up and prepared correctly and safely in accordance with manufactures' specifications and standard operating procedures.
3. Prepare surfaces using solvents as required	3.1. Safe working environment for solvent use is established according to regulatory requirements and standard operating procedures. 3.2. Solvents are applied correctly. 3.3. Treated surface is neutralised and made safe to handle.
4. Prepare surfaces using mechanical means as required	4.1. Safe working environment for mechanical surface preparation is established according to regulatory requirements and standard operating procedures. 4.2. Surfaces are prepared using mechanical means. 4.3. Mechanical equipment is cleaned and checked for damage and operational faults, in accordance with standard operating procedures. 4.4. Equipment faults are recorded and reported in accordance with standard operating procedures.
5. Inspect prepared surface	5.1. Surface preparation is checked for cleanliness and conformance to specifications. 5.2. Faults or defects are rectified where required and recorded/reported in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • planning and sequencing operations • preparing surfaces using solvents as required • preparing surfaces using mechanical means • setting up equipment and consumables • meeting all safety requirements

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REQUIRED SKILLS AND KNOWLEDGE
• using solvents correctly • neutralising solvents • using mechanical equipment to prepare surface • maintaining mechanical equipment • recording and reporting of faults • inspecting prepared surface • rectifying work performed • checking for conformance to specifications • reading and interpreting routine information on written job instructions, specifications and standard operating procedures • following oral instructions • applying measurement skills needed to meet the requirements of this unit • entering routine and familiar information onto proformas and standard workplace forms
Required knowledge
Look for evidence that confirms knowledge of: • common surface contaminates, conditions • reasons for selecting solvents • mechanical equipment required • procedure for setting up equipment • specifications applying to the surface to be prepared • methods for neutralising solvents • tools, equipment, abrasives and other materials • procedures for maintaining/storing mechanical equipment • procedures for recording/reporting faulty equipment • procedures checking prepared surfaces • rectification techniques • use and application of personal protective equipment • safe work practices and procedures • relevant hazards and control measures related to the competency

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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EVIDENCE GUIDE	
Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to select the appropriate preparation process, select and set up the equipment, undertake mechanical preparation or application of solvents as required and inspect the finished surface. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with surface preparation using solvents and/or mechanical means, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for	

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EVIDENCE GUIDE	
assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Surface preparation	New surfaces and restoration work
Solvents	A range of cleaning chemicals including acids, chlorinated solvents and hydrocarbons
Solvent application methods	Spraying, wiping, brushing, vapour degreasing etc.
Mechanical equipment	Linishers, grinders, polishers, sanders, blast device, enclosures, air grinders etc.
Consumables	Emery cloth/belts, grinding/sanding disks, grinding accessories etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units	

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Co-requisite units		

Competency field

Competency field	Surface finishing

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MEM08012B Prepare surfaces by abrasive blasting (basic)

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing a basic level of skill in surface preparation by abrasive blasting.

Application of the Unit

Application of the unit	This unit applies to surface preparation/cleaning on both ferrous and non-ferrous masonry and cementatious materials/components. Reference is made to supplier information and specifications as well as accepted and appropriate Australian and international standards. The majority of work is in a team environment and uses predetermined procedures and standards for safety and quality with all work and work practices undertaken to regulatory and legislative requirements. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM08016B	Control blast coating by-products, materials and emissions

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Prerequisite units		
	MEM13003B	Work safely with industrial chemicals and materials

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine job requirements	1.1. Work requirements are determined from job sheet, instructions or other predetermined specifications in accordance with standard operating procedures. 1.2. Appropriate abrasive blasting process, equipment and blasting media are identified to meet job specification. 1.3. Work site is prepared for surface cleaning activities.
2. Set up equipment	2.1. Appropriate equipment and any required consumables are assembled, set up and prepared correctly and safely in accordance with manufactures' specifications and standard operating procedures. 2.2. Correct rust inhibitor for use in wet abrasive blast methods is selected where required.

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Pre-operational checks are carried out on equipment and faults and are rectified or reported for further action.
3. Prepare surfaces using abrasive blasting	3.1. Blasting equipment is operated in accordance with standard operating procedures. 3.2. Emergency shut-down procedures can be undertaken. 3.3. Work procedures are undertaken to appropriate environmental requirements. 3.4. Abrasive media disposal is carried out in accordance with standard operating procedures. 3.5. Blasting equipment is cleaned and disassembled and inspected in accordance with manufacturers' specifications and standard operating procedures. 3.6. Equipment faults are recorded and reported in accordance with standard operating procedures.
4. Inspect prepared surface	4.1. Surface preparation is assessed for cleanliness and conformance with specifications. 4.2. Faults or defects are rectified where required and inspection results are recorded and reported in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • planning and sequencing operations • undertaking numerical operations within the scope of this unit • selecting blasting equipment and media • setting up equipment and consumables • selecting rust inhibitor • conducting pre-operational checks • preparing surfaces using abrasive blasting • disposing of abrasive media

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REQUIRED SKILLS AND KNOWLEDGE
• maintaining blasting equipment • identifying, recording and reporting of faults • inspecting prepared surface • performing rectification work • checking for conformance to specifications
Required knowledge
Look for evidence that confirms knowledge of: • reason for selecting the chosen sequence of operations • blasting equipment and media required • equipment, consumables for various methods • importance of using an appropriate rust inhibitor • process for undertaking pre-operational checks • procedures or using abrasive blasting equipment • procedures for abrasive media disposal • procedures for maintaining and storing blasting equipment • recording/reporting procedures; faulty equipment • checking prepared surfaces • rectification techniques • safe work practices and procedures • hazards and control measures related to abrasive blasting

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare surfaces by abrasive blasting (at a basic level). Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency

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EVIDENCE GUIDE	
	in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with preparing surfaces by abrasive blasting (basic) or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and

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RANGE STATEMENT	
regional contexts) may also be included.	
Blasting processes	Surface preparation using propelled abrasives including water, air steam, grits and blasting mediums
Blasting media	Abrasives, shot, glass beads, sand, steel shot, garnet, and other mediums accepted by industry and all regulatory bodies
Rust inhibitor	A substance which, when added to a corrosive liquid in small amounts, reduces the rate of corrosion
Blasting equipment	Electric and diesel compressors, blast pots, blast rooms, centrifugal blast machines, water pressure washers to 35,000 kpa, air hoses and nozzles, and specified hand and power tools, etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	

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MEM08013B Prepare surfaces by abrasive blasting (advanced)

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing an advanced level of skill in surface preparation using abrasive blasting.

Application of the Unit

Application of the unit	This unit is designed to be used where an advanced level of skill is desired in surface preparation using abrasive blasting. The operation and maintenance of compressed air systems and associated items, including emergency shut-down procedures, is included. Work is undertaken autonomously or as part of a team environment using accepted standards for safety, quality and procedures. All work and work practices are undertaken to regulatory and legislative requirements. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units		
Path 1	MEM08012B	Prepare surfaces by abrasive blasting (basic)
	MEM08016B	Control blast coating by-products, materials and emissions
	MEM13003B	Work safely with industrial chemicals and materials

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine job requirements	1.1. Work requirements are determined from job sheet, instructions or other specifications in accordance with standard operating procedures. 1.2. Appropriate abrasive blasting process and equipment are selected to meet job specification. 1.3. Appropriate abrasive blasting media and equipment are selected to meet job specification. 1.4. Work site is prepared for surface cleaning activities.
2. Set up equipment	2.1. Appropriate equipment and any required

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ELEMENT	PERFORMANCE CRITERIA
	consumables are assembled, set up and prepared correctly and safely in accordance with manufacturers' specifications and standard operating procedures. 2.2. Correct rust inhibitor for use in wet abrasive blast methods is selected where required. 2.3. Pre-operational checks are carried out on equipment and faults and are rectified or reported for further action.
3. Inspect surface prior to cleaning	3.1. Work piece is inspected prior to cleaning in accordance with standard operating procedures. 3.2. Identified faults/defects requiring remedial or pre-treatment action are reported as required.
4. Prepare surfaces using abrasive blasting	4.1. Blasting equipment is operated in accordance with standard operating procedures. 4.2. Emergency shut-down procedures can be carried out. 4.3. Work procedures are undertaken to appropriate environmental requirements. 4.4. Abrasive media disposal is carried out in accordance with standard operating procedures. 4.5. Blasting equipment is cleaned and disassembled and inspected in accordance with manufacturers' specifications and standard operating procedures. 4.6. Equipment faults are recorded and reported in accordance with standard operating procedures.
5. Inspect prepared surface	5.1. Surface preparation is assessed for cleanliness and conformance with specifications. 5.2. Faults or defects are rectified where required and inspection results are recorded and reported in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE
Look for evidence that confirms skills in: • preparing and sequencing operational work plan • selecting blasting process and equipment • selecting appropriate blasting media • setting up equipment • undertaking surface inspection prior to cleaning • reading and interpreting routine information on written job instructions, specifications and standard operating procedures. • following verbal instructions • orally reporting routine information • identifying faults and defects • checking and clarifying task-related information • checking for conformance to specifications
Required knowledge
Look for evidence that confirms knowledge of: • calculations and numerical operations within the scope of this unit • blasting media features • equipment for the selected method • inspection procedures • procedures for using abrasive blasting equipment • procedures for abrasive media disposal • safe work practices and procedures • hazards and control measures associated with preparing surfaces by abrasive blasting, including housekeeping

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare surfaces by abrasive blasting (at an advanced level). Competency in this unit cannot be claimed until all prerequisites have been satisfied.

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with preparing surfaces by abrasive blasting (advanced) or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Blasting process	Wet, dry, vacuum automatic rotary, centrifugal and water blasting (including HP and UHP)
Blasting media	Garnet, ilmenite, slags, steel grit, steel shot, water, glass bead and soda
Equipment	Blast nozzles, compressors, blast and helmet ventilation, air hoses, blast pots, nozzles, safety equipment etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Surface finishing

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MEM08014B Apply protective coatings (basic)

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers spraying pre-treatments and protective coatings not limited to brush, roller and conventional spray equipment, at a basic level.

Application of the Unit

Application of the unit	This unit is designed to be used where a basic level of skill is required. It covers single and two-pack coatings not containing isocyanates. Work is undertaken autonomously or as part of a team environment using predetermined standards of safety, quality and operating procedures. Specific health and safety matters include interpretation of MSDS warnings, materials sensitivity, hazardous goods, breathable air and introduction of compressed air into the body. Specific understanding is required of given supplier information and product details. Reference is made to supplier information and specifications as well as accepted and appropriate Australian and international standards. Where isocyanates are present, Unit MEM08015B (Apply protective coatings [advanced]) should be selected. Where required, Unit MEM11004B (Undertake dogging) and Unit MEM11010B (Operate mobile load shifting equipment) should also be selected. **Band**: **A** **Unit Weight**: **4**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM13003B	Work safely with industrial chemicals and materials

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine job requirements	1.1. Work requirements are determined from job sheet, instructions, drawings or visual inspection. 1.2. Required protective coating materials are identified according to job specification. 1.3. Required protective coating application equipment is

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ELEMENT	PERFORMANCE CRITERIA
	identified according to job requirements. 1.4. Work site is prepared for application of protective coating.
2. Work piece prepared for application of protective coating	2.1. Surface condition is inspected for readiness for application of protective coating according to specification. 2.2. Unsuitable work pieces/surfaces and fabrication defects are identified and appropriate remedial action or reporting is undertaken in accordance with standard operating procedures. 2.3. Components are masked where protective coating application is not specified. 2.4. Conditions for overspray are identified.
3. Equipment prepared for application of surface coating materials	3.1. Required plant and equipment basic operations are understood. 3.2. Routine maintenance is undertaken on plant and equipment in accordance with standard operating procedures. 3.3. Status/reports are recorded by proforma or orally in accordance with standard operating procedures. 3.4. Conventional coating application equipment is assembled in accordance with equipment requirements and standard operating procedures.
4. Apply single pack coatings	4.1. Coating product type, solvent, uses, mixing procedure, clean-up and safety requirements are identified as appropriate. 4.2. Correct method of determining wet film thickness in accordance with specified dry film is demonstrated. 4.3. Coating material is thinned to suit the application method and to achieve required film thickness. 4.4. Coating is applied using specified application method and standard operating procedures. 4.5. Coating schedules can be outlined for metal and non-metal materials. 4.6. Coating application and curing technique are monitored according to standard operating procedures.
5. Clean and store equipment	5.1. Conventional coating application equipment is cleaned, disassembled and inspected for damage. 5.2. Faulty equipment is recorded and reported to appropriate personnel in accordance with standard

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ELEMENT	PERFORMANCE CRITERIA
	operating procedures. 5.3. Coating application equipment is stored in accordance with standard operating procedures.
6. Inspect finish surface	6.1. Surface finish is assessed for profile size differences and uses. 6.2. Coating thickness is determined using appropriate instruments and results are compared with job specifications. 6.3. Total surface is inspected for conformance to specification in accordance with standard operating procedures. 6.4. Inspection results are recorded and reported in accordance with standard operating procedures.
7. Select and maintain personal protective equipment (PPE)	7.1. Appropriate personal protective equipment for coating application is selected according to job requirements and standard operating procedures. 7.2. Personal protective equipment is used appropriately in accordance with manufacturers' specifications and standard operating procedures. 7.3. Ancillary support attachments are identified and used. 7.4. Personal protective equipment is maintained in accordance with manufacturers' specification and standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • obtaining all relevant drawings, job sheets, specifications and instructions in accordance with workplace procedures • considering all relevant information and job requirements • preparing site with due regard to OH&S requirements including site safety, clear working space, other materials/structures/personnel in the vicinity, isolation of work site where required

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REQUIRED SKILLS AND KNOWLEDGE

- undertaking comprehensive inspection and considering specifications during inspection
- using standard workplace procedures to identify, select and apply the appropriate treatment or actions to rectify items with surface or fabrication defects
- identifying surface required as 'no paint areas' and protecting these using standard masking procedures and techniques
- undertaking precautions to prevent overspray in the workplace using standard procedures
- undertaking routine maintenance on plant and equipment in accordance with standard operating procedures
- preparing all required maintenance records/reports and details communicated
- assembling equipment in accordance with manufacturers' specifications and standard operating procedures
- identifying coating type and appropriate solvents and standard workplace procedures required for mixing processes, clean-up and safe handling
- using workplace procedures for determining the wet film thicknesses of a coating from the specified dry film thickness
- calculating required thickness in accordance with product volume solids
- applying standard operating procedures for thinning coating materials and applying the specified film thickness coating to a substrate
- applying protective coating to comply with an established standard using specified methods and standard operating procedures
- controlling coating application and curing techniques using standard operating procedures
- undertaking disassembly, cleaning and checking for functionality of spraying equipment and associated items in accordance with standard operating procedures
- using standard operating procedures to report on any damage or faulty parts and communicating with appropriate personnel
- following procedure for storage including any hazard reduction and/or protection of equipment and components
- checking surface condition of the work piece, including profile size properties and problems according to standard operating procedures and other acceptable standards
- determining thickness using mechanical, electronic or other appropriate instruments and testing results compared with job specifications, drawings etc.
- undertaking comprehensive inspection as required by standard operating procedures
- preparing all required inspection records/reports and details communicated
- selecting personal protective equipment suitable for applying protective coatings
- using appropriate personal protective equipment in workplace operations in accordance with standard procedures
- selecting the appropriate supports to use with personal protective equipment in standard operational practices

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REQUIRED SKILLS AND KNOWLEDGE
• checking personal protective equipment items for serviceability in accordance with manufacturers' specifications • recording and reporting faulty items to appropriate personnel using standard workplace procedures
Required knowledge
Look for evidence that confirms knowledge of: • work to be undertaken and specifications applying to the work • correct interpretation of all relevant information • safety issues, adequate precautions, awareness of other site factors that could be affected by the work • deviation from specified surface finish/condition • standard workplace procedures for identifying unsuitable work items • method of locating areas to be protected from coating process and masked • the areas subject to overspray and requiring protection • operation of plant and equipment using standard operating procedures • standard operating procedures for plant and equipment maintenance • the requirements for completion and processing of maintenance reports • assembly specifications and procedures • workplace procedures for identifying coating types and processing solvents, mixing and safe handling practices • the workplace procedures for determining the wet film thickness of a coating from the specified dry film thickness • calculations using a specified formulation • standard operating procedure for thinning coating materials for use in applying the specified film thickness coating to a substrate • standard operating procedures to apply protective coatings to comply with an established standard • procedures for controlling coating application and curing techniques • standard operating procedure for disassembly, cleaning and checking • standard operating procedures for recording and reporting defective parts • standard operating procedures for storage and protection of equipment • standard operating procedures and other relevant standards for assessing the profile of the surface finish • dry film thickness testing instruments • standard operating procedures for surface inspection, including the extent and detail of inspection as required • requirements for completion and processing of inspection reports • standard procedure for identifying and selecting the required personal protective equipment • the workplace standard procedure for the use of personal protective equipment

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REQUIRED SKILLS AND KNOWLEDGE
• the use and selection of appropriate supports to use with personal protective equipment in standard operational practices • standard procedures and manufacturers' specifications for inspecting and maintaining personal protective equipment in the workplace • hazard and control measures associated with applying protective coatings (basic) including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply protective coatings (basic). Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying protective coatings (basic) or other units requiring the exercise of the skills and knowledge

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EVIDENCE GUIDE	
	covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Personal protective equipment	Includes hand protection, full body protection, respirators, air fed hoods and foot protection. Noise and heat protection may also be necessary

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Surface finishing

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MEM08015B Apply protective coatings (advanced)

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit applies to spraying pre-treatments and protective coatings including conventional, two pack, plural component.

Application of the Unit

Application of the unit	This unit is for use when an advanced level of skill is required. It includes inspection and interpretation of the results using all current industry knowledge and equipment. Test equipment included but not limited to Holiday and Pin Hole testing, wet and dry film thickness gauges, temperature, relative humidity and dew point, hardness, gloss, adhesion and cure testing and soluble salts. Reference is made to supplier information and specifications as well as accepted and appropriate Australian and international standards. All work and work practices undertaken to regulatory and legislative requirements. For application of basic single and two pack coatings not containing isocyanates, Unit MEM08014B (Apply protective coatings [basic]) should be selected. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM08014B	Apply protective coatings (basic)
	MEM13003B	Work safely with industrial chemicals and materials

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine job requirements	1.1. Work requirements are determined from job sheet, instructions or other specifications in accordance with standard operating procedures. 1.2. Appropriate coating system and material is selected to meet job specification. 1.3. Appropriate coating process and equipment is selected to meet job specification. 1.4. Work site is prepared for surface coating activities.
2. Work piece prepared for application of	2.1. Surface condition is inspected for readiness for application of protective coating according to

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ELEMENT	PERFORMANCE CRITERIA
protective coating	specification. 2.2. Unsuitable work pieces/surfaces and fabrication defects are identified and appropriate remedial action or reporting is undertaken in accordance with standard operating procedures. 2.3. Components are masked where protective coating application is not specified. 2.4. Conditions for overspray are identified.
3. Equipment is prepared for application of surface coating materials	3.1. Required plant and equipment basic operations are understood. 3.2. Routine maintenance is undertaken on plant and equipment in accordance with standard operating procedures. 3.3. Status/reports are recorded by proforma or orally in accordance with standard operating procedures. 3.4. Coating application equipment is assembled in accordance with equipment requirements and standard operating procedures. 3.5. Personal protective equipment is selected and maintained in accordance with manufacturers' specifications and standard operating procedures.
4. Apply coatings using conventional, airless and plural component equipment	4.1. Coating product type, solvent, uses, mixing procedure, clean-up and safety requirements are identified as appropriate. 4.2. Correct method of determining wet film thickness in accordance with specified dry film is demonstrated. 4.3. Coating material is thinned to suit the application method and to achieve required film thickness. 4.4. Coating is applied using specified application method and standard operating procedures. 4.5. Coating application and curing technique is monitored according to standard operating procedures.
5. Clean and store equipment	5.1. Coating application equipment is cleaned, disassembled and inspected for damage. 5.2. Faulty equipment is recorded and reported to appropriate personnel in accordance with standard operating procedures. 5.3. Coating application equipment is stored in accordance with standard operating procedures.
6. Inspect finished	6.1. Surface finish is assessed for profile size differences

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ELEMENT	PERFORMANCE CRITERIA
surface	and uses. 6.2. Coating thickness is determined using appropriate instruments and results are compared with job specifications. 6.3. Total surface is inspected for conformance to specification in accordance with standard operating procedures. 6.4. Inspection results are recorded and reported in accordance with standard operating procedures.
7. Calculate, estimate and cost application of protective coating	7.1. Surface area of work piece, materials, labour and equipment are assessed. 7.2. Cost of materials, labour, handling and equipment are determined. 7.3. Results are recorded and reported as an estimate for the application of a protective coating system.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • obtaining all relevant drawings, job sheets, specifications and instructions in accordance with work place procedures • where appropriate, inspecting the surface(s) to be coated by the individual • selecting correct coating system and material for the job surface and use • selecting correct coating process and equipment for applying the selected coating material • preparing site with due regard to OH&S requirements including site safety, clear working space, other materials/structures/personnel in the vicinity, isolation of work site where required • using standard workplace procedures to identify, select and apply the appropriate treatment or actions to rectify items with surface or fabrication defects • identifying surfaces required as 'no paint areas' and protecting these using standard masking procedures and techniques • undertaking precautions to prevent overspray in the workplace using standard procedures

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REQUIRED SKILLS AND KNOWLEDGE

- undertaking routine maintenance on plant and equipment in accordance with standard operating procedures
- preparing all required maintenance records/reports and communicating details
- assembling equipment in accordance with manufacturers' specifications and standard operating procedures
- selecting appropriate personal protective equipment and maintaining this in accordance with job requirements, manufacturers' specifications, OH&S requirements and standard operating procedures
- inspecting work piece and identifying any faults in accordance with standard operating procedures
- using workplace procedures for determining the wet film thickness of a coating from the specified dry film thickness
- calculating required thickness in accordance with product volume solids
- applying standard operating procedures for thinning coating materials and applying the specified film thickness coating to a substrate
- applying protective coating to comply with an established standard using specified methods and standard operating procedures
- controlling coating application and curing techniques using standard operating procedures
- undertaking disassembly, cleaning and checking for functionality of spraying equipment and associated items in accordance with standard operating procedures
- using standard operating procedures to report on any damage or faulty parts and communicating with appropriate personnel
- following procedure for storage including any hazard reduction and/or protection of equipment and components
- checking surface condition of the work piece, including profile size properties and problems according to standard operating procedures and other acceptable standards
- determining thickness using mechanical, electronic or other appropriate instruments
- comparing test results with job specifications, drawings etc.
- undertaking inspection comprehensively as required by standard operating procedures
- preparing all required inspection records/reports and communicating details
- using appropriate inspection and assessment methods
- undertaking calculations in accordance with standard operating procedures and specifications
- recording and reporting calculated costs in accordance with standard operating procedures

Required knowledge

Look for evidence that confirms knowledge of:

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REQUIRED SKILLS AND KNOWLEDGE

- work to be undertaken
- specifications applying to the work
- appropriate coating system and material required to meet job specification
- features of the various types of coating materials, including drying and curing requirements
- selection procedures for coating material
- appropriate coating process and equipment required for surface coating to meet job specification
- application features of the various types of coating materials and methods
- selection procedures for coating process and equipment, including conventional, airless and plural component
- awareness of other site factors that could be affected by the work
- deviation from specified surface finish/condition
- standard workplace procedures for identifying unsuitable work items
- method of locating areas to be protected from coating process and masked
- the areas subject to overspray and requiring protection
- operation of plant and equipment using standard operating procedures
- standard operating procedures for routine maintenance of plant end equipment
- requirements for completion and processing maintenance reports
- procedure for selecting and maintaining personal protective equipment
- inspection procedure
- unsuitable work pieces in consideration of job specifications
- the workplace procedures for determining wet film thickness of a coating from the specified dry film thickness
- calculations using a specified formulation
- standard operating procedures for thinning coating materials for use in applying the specified film thickness coating to a substrate
- standard operating procedures to apply protective coatings to comply with an established standard
- the procedures for controlling coating application and curing techniques
- standard operating procedure for disassembly, cleaning and checking
- standard operating procedures for recording and reporting defective parts
- standard operating procedures for storage and protection of equipment
- standard operating procedures and other relevant standards for assessing the profile of the surface finish
- dry film thickness testing instruments
- standard operating procedures for surface inspection, including the extent and detail of inspection as required
- the requirements for completion and processing of inspection reports
- the standard methods and procedures for determining surface area of various shapes of materials

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REQUIRED SKILLS AND KNOWLEDGE
• standard procedures for calculating costs • the standard operating procedures for recording and reporting calculated costs • hazard and control measures associated with applying protective coatings (advanced), including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply protective coatings (advanced). Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying protective coatings (advanced) or other units requiring the exercise of the skills and knowledge covered by this unit.

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EVIDENCE GUIDE	
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Surface finishing

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MEM08016B Control blast coating by-products, materials and emissions

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers identifying, evaluating and controlling blaster coating by-products, materials and emissions.

Application of the Unit

Application of the unit	This unit applies to common containment practices and regulatory waste removal processes, documentation and implementation related to blaster coating by-products, materials and emissions in accordance with regulatory and legislative requirements. **Band**: **A** **Unit Weight**: **1**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM13003B	Work safely with industrial chemicals and materials

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Apply specific health and safety considerations to surface preparation	1.1. Products, hazardous materials and processes used in blaster cleaning and coating operations are identified. 1.2. Safety procedures appropriate to the work requirements are applied. 1.3. Unsafe working conditions are identified and reported to appropriate personnel.
2. Control by-products, materials and emissions	2.1. By-products, materials and emissions are contained using established procedures. 2.2. By-products, materials and emissions are monitored and directed to appropriate treatment or storage area. 2.3. Monitoring devices are checked for correct/continuous operation. 2.4. Status/reports are recorded and reported.
3. Dispose of by-product, materials and emissions	3.1. Waste treatment processes are applied in accordance with standard operating procedures. 3.2. Treatment processes are carried out in accordance with standard operating procedures and to meet relevant authority waste requirements.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • collecting, storing and removing samples of by-products • monitoring and transferring by-product and emissions • checking monitoring devices • implementing waste treatment process • recording and reporting of all results • collecting, storing, removing and sampling by-products
Required knowledge
Required knowledge • Look for evidence that confirms knowledge of: • products, hazardous materials and processes within the scope of this unit • regulatory and legislative requirements relating to control of blast coating by-products, materials and emissions • procedures for collecting samples • by-product collection equipment operation methods • waste control monitoring equipment and procedures • waste treatment processes • requirements and procedures for recording and reporting process status reports • hazards and control measures associated with controlling blast coating by-products, materials and emissions • use and application of personal protective equipment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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EVIDENCE GUIDE	
Guidelines for the Training Package.	
Overview of assessment	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with controlling blast coating by-products, materials and emissions or other units requiring the exercise of the skills and knowledge covered by this unit.
Context of and specific resources for assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Method of assessment	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Products, **hazardous materials and processes**	All products, hazardous materials and processes that are subject to codes and/or regulations in use
Monitoring devices	pH meters, probes
Waste treatment processes	Neutralisation, metals precipitation, solid separation-gravity/centrifuging

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Surface finishing

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MEM09002B Interpret technical drawing

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers interpreting technical drawing applying to any of the full range of engineering disciplines.

Application of the Unit

Application of the unit	Technical drawings may utilise perspective, exploded views or hidden view techniques. Drawings are provided to Australian Standard 1100 and/or Australian Standard 1102 and their equivalents from the full range of engineering disciplines. Standard symbols to Australian Standard 1100 and/or Australian Standard 1102 or equivalent are recognised in field of employment. Technical drawings may include symbol glossaries. Where any drawing, sketch, chart, diagram is only used as the technique for communication, then this unit does not apply: see Unit MEM12023A (perform engineering measurements) or Unit MEM16006A (Organise and communicate information). **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Select correct technical drawing	1.1. Drawing is checked and validated against job requirements or equipment. 1.2. Drawing version is checked and validated.
2. Interpret technical drawing	2.1. Components, assemblies or objects are recognised as required. 2.2. Dimensions are identified as appropriate to field of employment. 2.3. Instructions are identified and followed as required. 2.4. Material requirements are identified as required. 2.5. Symbols are recognised in the drawing as appropriate.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- checking the drawing against job requirements/related equipment in accordance with standard operating procedures
- confirming the drawing version as being current in accordance with standard operating procedures
- where appropriate, obtaining the current version of the drawing in accordance with standard operating procedures
- reading, interpreting information on the drawing, written job instructions, specifications, standard operating procedures, charts, lists and other applicable reference documents
- checking and clarifying task related information
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Look for evidence that confirms knowledge of:

- application of AS1100.101 in accordance with standard operating procedures
- relationship between the views contained in the drawing
- objects represented in the drawing
- units of measurement used in the preparation of the drawing
- dimensions of the key features of the objects depicted in the drawing
- understanding of the instructions contained in the drawing
- the actions to be undertaken in response to those instructions
- the materials from which the object(s) are made
- any symbols used in the drawing as described in range statement
- hazard and control measures associated with interpreting technical drawings, including housekeeping
- safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to interpret technical drawings as described.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with interpreting technical drawings or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Interpret technical drawing	AS1100.101 is an extensive work and the candidate is not required to have complete familiarity with all its contents, the application of AS1100 would usually be in line with standard operating procedures; interpretation may require guidance particularly in respect to any geometric tolerancing

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Drawing, drafting and design

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MEM09005B Perform basic engineering detail drafting

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers producing drawings to Australian Standard 1100 or equivalent where the critical dimensions and associated tolerances and design specifications are predetermined.

Application of the Unit

Application of the unit	Manual drafting or drawing equipment is used or where a CAD (Computer Aided Design) system is used, Unit MEM09009C (Create 2D drawings using computer aided design system) and/or Unit MEM09010C (Create 3D models using computer aided design system) should also be considered. **Band**: **A** **Unit Weight**: **8**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM09003B	Prepare basic engineering drawing

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare assembly, layout and detail drafting	1.1. Drawings are prepared in plane orthogonal, isometric projection or equivalent including auxiliary views and sections to Australian Standard 1100. 1.2. Layout, assembly and component drawings are prepared from specification. 1.3. Drawings are dimensioned and labelled using supplied tolerances in accordance with Australian Standard 1100. 1.4. Drawings are produced to specification in accordance with standard operating procedures. 1.5. Standard symbols to Australian Standard 1100 or equivalent are used to specify requirements.
2. Determine component and/or material requirement	2.1. Components and/or materials are selected from supplier/manufacturers' catalogues using design specifications.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- preparing drawings using appropriate projections and views in accordance with AS1100 or equivalent, see above note in the range statement
- producing layout, assembly and component drawings in conformance with specification
- inserting all relevant dimensions, tolerances and instructions in the drawing
- producing drawings to specification
- appropriately using standard symbols in accordance with AS1100 or equivalent in the drawings produced
- obtaining component specifications in accordance with work place procedures
- reading, interpreting and following information written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying task related information
- checking for conformance to specifications
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Look for evidence that confirms knowledge of:

- appropriate projection for the drawing purpose
- reasons for selecting the chosen projection
- reasons for including auxiliary views in drawings
- requirements of AS1100 or equivalent with respect to dimensions, tolerances and labels
- procedures for producing component, layout and/or assembly drawings
- drawing specifications
- common symbols used in drawings to AS1100 or equivalent
- design specifications of the component
- appropriate components and materials from supplier/manufacturers' catalogues
- reasons for selecting the chosen components and/or materials
- safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform basic engineering detail drafting. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with basic engineering detail drafting or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes,

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EVIDENCE GUIDE	
	standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Australian Standard 1100	AS1100.100 is an extensive work and its application would usually be in line with standard operating procedures; interpretation would be under guidance particularly in respect to any geometric tolerancing

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Drawing, drafting and design

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MEM09006B Perform advanced engineering detail drafting

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers producing assembly, layout and detail drawings to Australian Standard 1100 or equivalent.

Application of the Unit

Application of the unit	Skills covered by this unit are applied individually or in a team environment where comprehensive responsibility for the production of the drawing is exercised, and critical dimensions and associated tolerances are determined where required. Manual drafting and drawing equipment is used or where a CAD (Computer Aided Design) system is used, Unit MEM09009C (Create 2D drawings using computer aided design system) and/or Unit MEM09010C (Create 3D models using computer aided design system) should also be considered. **Band**: **B** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM09003B	Prepare basic engineering drawing
	MEM09005B	Basic engineering detail drafting

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare assembly, layout and detail drawing	1.1. Specification requirements are determined. 1.2. Engineering calculations are undertaken to determine all dimensions including limits and fits, surface texture, datum references and geometric tolerances where appropriate to ensure functional operation and suitability. 1.3. All drawings are produced to Australian Standard 1100 or equivalent.
2. Interpret specifications and select material, components and/or	2.1. Components, material and/or assemblies are selected from data sheets or manufacturers' catalogues to meet specifications.

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ELEMENT	PERFORMANCE CRITERIA
assemblies	
3. Check drawings	3.1. Drawings are checked to ensure compliance with specifications. 3.2. Drawings are checked to ensure that assembly/fabrication is possible.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- obtaining all relevant work instructions and requirements
- producing all drawings in accordance with AS1100 or equivalent
- obtaining all relevant data sheets, catalogues, etc.
- checking drawings for conformance to specification
- checking drawings to ensure that assembly/fabrication is possible
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying task related information
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Look for evidence that confirms knowledge of:

- specifications and/or requirements of the component, assembly or layout to be drawn
- functional operation of the component/assembly to be drawn
- surfaces which are to be in contact or separated
- appropriate type of fit for contacting surfaces
- reasons for selecting the chosen type of fit
- effect of surface finish on the performance/operation of surfaces
- appropriate datum points

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REQUIRED SKILLS AND KNOWLEDGE
• all appropriate lineal, diametric and geometric tolerances • procedures for determining tolerances • requirements of AS1100 or equivalent for the drawing(s) to be produced • specifications of the components, materials and/or assemblies • appropriate components and materials from supplier/manufacturers' catalogues • reasons for selecting the chosen components and/or materials • procedures for checking and approving drawings • reasons for checking the drawings to ensure that manufacturing/assembly is possible, efficient and cost effective • drawing specifications • methods of manufacture/assembly/fabrication from the drawing(s) • unnecessary or inappropriate tolerances • hazards and control measures associated with performing advanced engineering detail drafting, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform advanced engineering detail drafting. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this

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EVIDENCE GUIDE	
	unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing advanced engineering detail drafting or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Australian Standard 1100 or equivalent	Complete familiarity with AS 1100.101 or similar and its application is required in the respective field

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Drawing, drafting and design

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MEM09009C Create 2D drawings using computer aided design system

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing the CAD environment, creating 2D drawings, and producing output including linked bills of materials.

Application of the Unit

Application of the unit	This unit applies to the production of 2D drawings using a CAD system, linked bills of material, file management and associated customisation of installed software including the use of macros, menus and default settings; file formats may include IGES, DXF, HPGL. The unit applies to the fields of mechanical, electrical/electronic, fabrication, and fluid power. 2D drawings may be produced from 3D models created using computer aided design system. This unit covers CAD skills only. Where detail drafting skills are required, the following units should be considered: Unit MEM09004B (Perform electrical/electronic detail drafting), Unit MEM09005B (Perform basic engineering detail drafting), Unit MEM09006B (Perform advanced engineering detail drafting). **Band**: **B** **Unit Weight**: **8**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM16008A	Interact with computing technology

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare CAD environment	1.1. System variables are customised to suit standard operating procedures. 1.2. Menus are customised to suit standard operating procedures. 1.3. Drawing defaults are customised to standard operating procedures. 1.4. Macros are developed to standard operating procedures.

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ELEMENT	PERFORMANCE CRITERIA
2. Create 2D drawings	2.1. Drawings are created using the full capability of the available software system. 2.2. Drawing entities are linked to database attributes to suit job requirements. 2.3. Detailed views are created using various scales to meet job requirements.
3. Produce output	3.1. Files are saved in various formats to standard operating procedures. 3.2. Linked entities are listed in a bill of materials format to meet job requirements. 3.3. Supplementary data is extracted from drawing to meet job requirements and may include area, lengths, angles and perimeters.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- obtaining all relevant manuals, instructions and operation procedures for the CAD software and hardware being used
- where appropriate, customising the relevant system variables to suit the applicable drafting standards/procedures
- where appropriate, customising menus to suit the applicable drafting standards/procedures
- where appropriate, customising the system defaults to suit the applicable drafting standards/procedures
- where appropriate, developing macros
- creating drawings using the appropriate drawing features of the software system
- where appropriate, linking drawing entities to database attributes
- producing detailed views of the object being drawn
- printing drawing files at the appropriate scale
- saving drawing files in the appropriate format
- producing bills of material from the drawing files/database
- extracting supplementary data from the drawing file to meet job requirements

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REQUIRED SKILLS AND KNOWLEDGE

- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying task related information
- checking for conformance to specifications
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Look for evidence that confirms knowledge of:

- CAD software system
- system variables that can be customised
- procedures for customising identified system variables
- reasons for customising the system variables
- applicable drafting standards/procedures
- procedures for customising menus
- reasons for customising menus
- procedures for customising system defaults
- reasons for customising system defaults
- procedures for developing macros
- reasons for developing macros
- drawing features of the CAD software system
- reasons for using specialised software features
- procedures for linking drawing entities to database attributes
- appropriate drawing scales
- procedures for printing drawing files
- procedures for creating additional views of the object being drawn
- procedures for saving drawing files
- various formats in which drawing files can be saved
- reasons for using different formats when saving drawing files
- procedures to produce bills of material
- procedures to extract data with respect to drawn shapes/features
- properties of shapes/sections/ features that can be extracted from the drawing file
- hazards and control measures associated with using computer aided design system, including housekeeping
- safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to create 2D drawings using computer aided design system. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with creating 2D drawings using computer aided design system or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Drawing	Include plans, diagrams, charts, electrical/electronic circuits
Entities	Mean any single item created on the screen and includes for example lines, arcs, circles, text, hatch and dimensions
Attributes	Mean properties associated with an entity and includes for example layer or level, line type, line width, colour and text

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Co-requisite units		

Competency field

Competency field	Drawing, drafting and design

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MEM09011B Apply basic engineering design concepts

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers applying in situ design skills by personnel who are then responsible for the manufacture of the design outcome either individually or as part of a team.

Application of the Unit

Application of the unit	This unit includes the determination of requirements such as location, assembly or other parts of the manufacturing or engineering process and where the designer must consider the impact of the design on other equipment, process or personnel, for example safety aspects of the design. Design tasks undertaken include the application of design concepts to, for example, the fabrication and modification of structures, plant and equipment, and design of tooling and gauges, production control systems, fluid power layouts, electrical circuits etc. The unit applies to the fields of mechanical, production, electrical/electronic, fabrication, and fluid power. **Band**: **A** **Unit Weight**: **6**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine design requirements	1.1. Design requirement is established from job sheets, instructions or in consultation with appropriate people. 1.2. Design concepts are established and may include consideration of process, material, quantity, cost and outcome. 1.3. Where appropriate, codes, regulations and technical documentation are consulted to establish design limitations in accordance with standard operating procedures. 1.4. Sources of expert assistance are identified and used as required.

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ELEMENT	PERFORMANCE CRITERIA
2. Create design	2.1. Design meets end use requirement. 2.2. Design meets all legislative and regulatory requirements. 2.3. Design concept is verified in accordance with standard operating procedures. 2.4. Design outcome is produced as per job requirements and may include sketch, drawing, prototype, document, model or finished product.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- obtaining all relevant drawings, job sheets, instructions and specifications
- consulting, where appropriate, relevant personnel as to the design requirements
- inspecting, where appropriate, the object, plant or equipment to which engineering design concepts are to be applied
- determining, where appropriate, design limitations imposed by relevant codes, standards and regulations
- where appropriate, seeking assistance from relevant sources
- verifying the design concept.
- presenting the design object in a form appropriate to the job requirements
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- checking and clarifying task related information
- planning and sequencing operations
- checking for conformance to specifications
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Look for evidence that confirms knowledge of:

- design requirements

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REQUIRED SKILLS AND KNOWLEDGE
• functional requirements of the design • the material(s) appropriate to the environment in which the object(s) to be designed is to operate • processes to be used in the manufacture of the object(s) • where appropriate, the costs associated with the manufacture of the object(s) • reasons for selecting the chosen design concept • all relevant codes, standards and regulations applying to the object to be designed • the impact of the applicable codes, standards and regulations on the design requirements of the object • sources of expert assistance in the design process • the end use requirements of the design • checks to ensure the design complies with the relevant codes, standards, legislative and regulatory requirements • the procedures for verifying design concepts • the means by which the design concept is to be presented • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply basic engineering design concepts. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic

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EVIDENCE GUIDE	
	workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying basic engineering design concepts or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

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RANGE STATEMENT	

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Drawing, drafting and design

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MEM09155A Prepare mechanical models for computer-aided engineering (CAE)

Modification History

Release 1 - New unit. Replaces MEM09151A but not equivalent

Unit Descriptor

This unit of competency covers the application of mechanical modelling techniques for computer-aided engineering (CAE) purposes. It includes model creation for purposes such as computer-aided manufacturing (CAM) and computer numerical control (CNC) applications, rapid prototyping and stress analysis, and as a basis for generating orthogonal drawings.

Application of the Unit

This unit applies to modelling of mechanical, maintenance and manufacturing engineering products, plant and system for CAE applications. It is suitable for people working in design drafting and those pursuing technical qualifications and careers at engineering technician level.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A Apply technical mathematics

MEM23109A Apply engineering mechanics principles

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential Performance criteria describe the performance needed

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outcomes of a unit of competency. to demonstrate achievement of the element.

Elements and Performance Criteria

1	Identify model parameters	1.1	Identify the engineering context of computer modelling
		1.2	Identify sustainability issues related to required models
		1.3	Identify work health and safety (WHS) and regulatory requirements related to modelling processes and materials
		1.4	Identify the virtual or physical model parameters, form, function and features
		1.5	Identify required model generation processes, including any required graphics generation, post-processing and physical modelling
		1.6	Identify licensed technical and professional assistance for advice, as required
2	Develop model	2.1	Generate initial graphical model
		2.2	Undertake initial consultation on model with stakeholders and adjust, as required
		2.3	Prepare model for intended purpose
		2.4	Trial model for purpose and complete investigative analysis or produce physical model
		2.5	Evaluate model against design criteria with stakeholders and make adjustments, as required
		2.6	Engage appropriate licensed technical and professional assistance for advice, as required
3	Finalise modelling	3.1	Prepare final model
		3.2	Report and demonstrate results

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3.3 Provide documentation, instructions, models and files, as required

3.4 Obtain sign-off

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- reviewing features, functions and context of engineering modelling, including imminent future developments
- comparing available software, functions and features
- communicating, participating and negotiating with:
  - stakeholders, team, cross-function support groups and experts
  - appropriate licensed technicians and professionals
- modelling using a comprehensive range of techniques, such as:
  - creating and manipulating 3-D entities
  - using library files and adaptations
  - accessing supplier catalogues and databases
- creating dimensioned orthographic projections from model
- extracting dimensional properties from model:
  - post-processing model for analysis or physical modelling
- finalising modelling by:
  - completing work
  - gaining approval and commissioning work
  - providing documentation and reports, as required
  - obtaining sign-off

Required knowledge

Required knowledge includes:

- advantages and disadvantages of CAM using modelling compared to traditional manufacturing methods
- implications to be taken into account when modelling (e.g. efficiency of production, generation of waste and life cycle considerations)
- typical mechanical components, assemblies and layouts suitable for modelling

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- software functions and features
- model creation techniques, including:
  - using and manipulating coordinate systems
  - creating 3-D entities, ruled and revolved surfaces
  - creating solids, editing and combining solids
  - manipulating entities and solids
  - library files
  - manipulations of solids and library files
  - 3-D graphics from models, including rotated views and sections
  - dimensioned orthographic representations from models
- typical modelling processes, including:
  - computer modelling
  - post-processing
  - prototyping and model manufacture
- mathematical model analysis options, such as:
  - finite analysis of heat flows
  - finite analysis of stresses and deflections
- physical modelling options
- traditional, current and emerging modelling methods
- WHS and regulatory requirements, codes of practice, risk assessment and registration requirements relevant to modelling task
- job requirements that may create a need for licensed technical and professional services assistance
- modelling compared to traditional representation methods, including:
  - pen and pencil graphics compared to wire frame, surface and solid models
  - computer animations compared to transparent overlay mobiles to test clearances and motions
  - solid models compared to isometric representations
  - computer library files compared to the use of reference charts and catalogue information

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to produce a variety of mechanical, manufacturing and

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	maintenance-related models that are consistent with design information and relevant standards and conventions.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • review features, functions and context of engineering modelling • compare available software, functions and features • communicate, participate and negotiate with stakeholders, team, cross-function support groups and experts, appropriate licensed technicians and professionals • model using a comprehensive range of techniques • create dimensioned orthographic projections from model • extract dimensional properties from model • post-process model for analysis or physical modelling • complete work, commission and gain approval, document and report, and obtain sign-off • identify future developments in modelling.
Context of and specific resources for assessment	• Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and WHS practices. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application.

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	• Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Models	Models may be: • virtual, such as computer generated solids models • physical models developed from the virtual model data
Model purpose	Models covered by this unit include mechanical, maintenance and manufacturing engineering products, plant and system models. Examples of models include: • computer model of a cavity mould for finite analysis of heat flows • computer model of a container, vehicle or frame for finite analysis of stresses and deflections • physical models of components produced for form, fit or aesthetic purposes • physical models, such as a once-off vehicle body panel,

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	produced ready and fit for purpose • physical models, such as a sintered metal moulds or die capable of producing a limited run of production components
Features, functions and context of engineering modelling	Features, functions and context of mechanical modelling include: • techniques used for mechanical modelling • sustainability implications of modelling • WHS and regulatory requirements related to modelling processes and materials • model parameters, form, function and features, virtual or physical • processes required which may include those for generating graphics, post-processing and physical modelling • required licensed technical and professional assistance
Post-processor	A post-processor or code generator converts programmed instructions generated by CAM software or CAD package into CNC program code to control a machine tool
Post-processing model for analysis or physical modelling	Examples of post-processing model for analysis or physical modelling include: • setting up model with physical properties, mesh and nodes for finite element analysis (FEA) • processing dimensional data to create 3-D code for CAM operations • post-processing to create CNC data files to control CNC devices, including mills, lathes, machining centres, lasers, ultrasonic cutters and routers • modelling for rapid prototyping
Rapid prototyping	A variety of rapid prototyping processes are available, including: • selective laser sintering (SLS) which uses thermoplastics and metal powders • fused deposition modelling (FDM) which uses thermoplastics and eutectic metals • steriolithography (SLS) which uses a photopolymer • laminated paper manufacturing (LPM) which uses paper

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	• electron beam melting (EBM) which uses titanium alloys • 3-D printing (3-DP) which uses a variety of materials
Criteria for mechanical designs	Criteria for mechanical designs may include: • function • aesthetics • manufacturability and maintainability • marketability • sustainability • cost constraints • ergonomics, anthropometrics and physiology • facilities, plant and skills available • safety and risk
Mechanical components, assemblies and layouts	Mechanical assemblies may include: • chain drives, gear sets, pulley and belt drives • threads, fasteners and springs • shafts, keyways and splines • structural sections • machines, drives and transmissions • materials handling equipment, including belt conveyors, augers and pneumatic conveyors • guards, handrails and platforms • structures, vessels and tanks • fan, ventilation, air conditioning service and ducting • production process layouts

Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano

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	materials • special processes, foundry, alloy welding, heat treatment, sealing and fastening
WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • other relevant regulations and standards • industry codes of practice • risk assessments • registration requirements • safe work practices
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular design task
Modelling and related software	Modelling and related software may include: • lumped parameter model • empirical, random data tested model • FEA software • model-based design

Unit Sector(s)

Competency field

Unit sector Drawing, drafting and design

Custom Content Section

Not applicable.

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MEM09156A Prepare mechatronic models for computer-aided engineering (CAE)

Modification History

Release 1 - New unit. Replaces MEM09152A, but not equivalent.

Unit Descriptor

This unit of competency covers the application of techniques for mechatronic modelling for computer-aided engineering (CAE) purposes. It includes consideration of the CAE purposes for which the model is required, such as automated mechanisms, robots or system control and data acquisition (SCADA) environments, printed circuit board manufacture and assembly, and as a basis for generating orthogonal drawings.

Application of the Unit

This unit applies to modelling of mechatronic or automation systems and devices for CAE applications. It is suitable for people working in design drafting and those pursuing careers and qualifications in mechatronics, automated systems or systems maintenance at engineering technician level.

Prior or concurrently developed competence in graphics, workshop, electrical and electronic fundamentals, engineering science, mathematics and mechanical components, and manufacturing plant is required.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23109A	Apply engineering mechanics principles
MEM23111A	Select electrical equipment and components for engineering applications
MEM23112A	Investigate electrical and electronic controllers in engineering applications

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Identify the model parameters	1.1	Investigate applications for modelling in mechatronics
		1.2	Identify work health and safety (WHS) and regulatory requirements related to modelling processes and materials
		1.3	Identify the virtual parameters, form, function and features
		1.4	Identify required model generation processes required, including graphics generation and post-processing
		1.5	Identify licensed technical and professional assistance for advice, as required
2	Develop model	2.1	Generate initial graphical model
		2.2	Undertake initial consultation on model with stakeholders and adjust, as required
		2.3	Prepare and trial model for intended purpose
		2.4	Evaluate model against design criteria in consultation with stakeholders and make adjustments to model, as required
		2.5	Engage appropriate licensed technical and professional assistance for advice, as required

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3	Finalise model	3.1	Prepare final model
		3.2	Report and demonstrate results
		3.3	Provide documentation, instructions, models and files, as required
		3.4	Obtain sign-off

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- investigating the uses of mechatronic models
- reviewing features, functions and context of mechatronic modelling, including imminent future developments
- comparing available software, functions and features
- communicating, participating and negotiating with:
  - stakeholders, team, cross-function support groups and experts
  - appropriate licensed technicians and professionals
- modelling using a comprehensive range of techniques, such as:
  - creating and manipulating 3-D entities
  - using library files and adaptations
  - accessing supplier catalogues and databases
- creating dimensioned orthographic projections from model
- extracting dimensional properties from model
- post-processing model for analysis or physical modelling
- finalising modelling by:
  - completing work
  - gaining approval and commissioning work
  - providing documentation and reports, as required
  - obtaining sign-off

Required knowledge

Required knowledge includes:

- advantages and disadvantages of computer-aided manufacturing (CAM) using modelling

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compared to traditional manufacturing methods
- implications to be taken into account when modelling (e.g. efficiency of production, generation of waste, life cycle considerations, and accessing supplier catalogues and databases)
- typical mechatronic components, assemblies and layouts suitable for modelling
- software functions and features
- model creation techniques, including:
  - using and manipulating coordinate systems
  - creating 3-D entities, ruled and revolved surfaces
  - creating solids, editing and combining solids
  - manipulating entities and solids
  - library files
  - manipulations of solids and library files
  - 3-D graphics from models, including rotated views and sections
  - dimensioned orthographic representations from models
- typical modelling processes, including:
  - computer modelling
  - post-processing
- virtual model options, including automated systems simulation of motions:
  - post-processing to create numeric control (NC) data files to computer numeric control (CNC) circuit board assembly or gantry robot assembly of boards
  - rapid prototyping options
  - finite element analysis (FEA) using software
- WHS and regulatory requirements, codes of practice, risk assessment and registration requirements, relevant to modelling task
- job requirements that may create a need for licensed technical and professional services
- modelling compared to traditional representation methods, including:
  - pen and pencil graphics compared to wire frame, surface and solid models
  - computer animations compared to transparent overlay mobiles to test clearances and motions
  - solid models compared to isometric representations
  - computer library files compared to the use of reference charts and catalogue information

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to produce a variety of mechatronic-related models that are

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	consistent with design information and relevant standards and conventions.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate competently and consistently: • review features, functions and context of mechatronic modelling • compare available software, functions and features • communicate, participate and negotiate with stakeholders, team, cross-function support groups and experts, appropriate licensed technicians and professionals • model using a comprehensive range of techniques • create dimensioned orthographic projections from model • extract dimensional properties from model • post-process model for analysis or physical modelling • complete work, commission and gain approval, document and report, and obtain sign-off • identify future developments in modelling.
Context of and specific resources for assessment	• Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and WHS practices. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other

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	circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Models	Models may be: • virtual, such as computer generated solids models • physical models developed from the virtual model data
Model purpose	Models covered by this unit include mechanical, maintenance and manufacturing engineering products, plant and system models. Examples of models include: • virtual robot model for motion simulation • automated process simulation • printed circuit board model for component fit or robot assembly
Features, functions and context of engineering modelling	Features, functions and context of mechanical modelling include: • techniques used for mechanical modelling • sustainability implications of modelling • WHS and regulatory requirements related to modelling processes and materials • model parameters, form, function and features, virtual or physical • processes required which may include those for generating

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	graphics, post-processing and physical modelling • required licensed technical and professional assistance
Post-processor	A post-processor or code generator converts programmed instructions generated by CAM software or computer-aided design (CAD) package into CNC program code to control a machine tool
Post-processing model for analysis or physical modelling	Examples of post-processing model for analysis or physical modelling include: • setting up robotic model for motion analysis • processing dimensional data to create 2-D or 3-D code for CAM operations, such as printed circuit board manufacture • post-processing to create NC data files to control NC devices, including mills, lathes, machining centres, lasers, ultrasonic cutters and routers • modelling for rapid prototyping
Rapid prototyping	A variety of rapid prototyping processes are available, including: • selective laser sintering (SLS) which uses thermoplastics and metal powders • fused deposition modelling (FDM) which uses thermoplastics and eutectic metals • steriolithography (SLS) which uses a photopolymer • laminated paper manufacturing (LPM) which uses paper • electron beam melting (EBM) which uses titanium alloys • 3-D printing (3-DP) which uses a variety of materials
Criteria for mechatronic designs	Criteria for mechatronic designs may include: • safety and risk • function • aesthetics • manufacturability and maintainability • marketability • sustainability • cost constraints • ergonomics, anthropometrics and physiology • facilities, plant and skills available

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Mechatronic components, assemblies and layouts	Mechatronic assemblies may include: • electrical motors and fluid power actuators • printed circuit boards • electrical, electronic and electro fluid controls • chain drives, gear sets, pulley and belt drives • structural sections • mechatronic assembly models, including robots,automated mechanisms and machines • materials handling equipment, including belt conveyors, augers and pneumatic conveyors • manufacturing plant and process layouts • manufactured product with embedded controller

Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • other relevant regulations and standards • industry codes of practice • risk assessments • registration requirements • safe work practices

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Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular design task
Modelling and related software	Modelling and related software may include: • lumped parameter model • empirical, random data tested model • FEA software • model-based design

Unit Sector(s)

Competency field

Unit sector Drawing, drafting and design

Custom Content Section

Not applicable.

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MEM09157A Perform mechanical engineering design drafting

Modification History

Release 1 New unit. Replaces MEM09141A but not equivalent.

Unit Descriptor

This unit of competency covers the preparation of design drawings or graphics used in the mechanical engineering, manufacturing engineering and related industry sectors. The unit includes working with a design brief or concept prepared by an engineer or other designer as well as the specification of items, functions, limits, fits, tolerances, and other engineering information required for the eventual production of fully detailed drawings. The unit requires the design drawing to be performed using appropriate computer-aided design (CAD) and other drafting techniques that include sketching, computer graphics and the application of drawing standards.

Application of the Unit

This unit applies to the undertaking of designated design tasks and the specification in design drawings and graphics of mechanical plant, products, projects, system changes or improvements in domestic, commercial, industrial, agricultural, medical, military or entertainment industries. For ease of reference the term ‘drawing’ is used in this unit.

The design drawing is normally undertaken at the direction of an engineer, scientist or other designer who will pass on a concept brief to the design draftsperson. The concept brief may be a sketch, hard copy plan or document, or a CAD generated file. The unit requires design drawings to be produced using appropriate CAD software. Depending on the task or project, production or supervision of hard copy drawings may also be required.

The unit also includes supervision of detailed drawing production and managing of requests for further information from detailed draftspersons.

This may require completion of appropriate engineering design or evaluation units from the MEM05 Metal and Engineering Training Package depending on the design drawing task and previous industrial experience.

This unit does not cover the production of detailed drawings (often known as shop drawings). Where detailed drawing skills are required the relevant MEM detailed drawing units should be selected.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Clarify the design drawing task	1.1	Receive design drawing brief and check completeness of information
		1.2	Confirm software and file formats to be used for design drawings with designer and detail draftspersons
		1.3	Determine stakeholders to be consulted in design drawing process
		1.4	Assess work health and safety (WHS), regulatory, sustainability or environmental issues relevant to design task
		1.5	Confirm design drawing brief and provide preliminary advice on feasibility
2	Produce mechanical or maintenance engineering-related drawings	2.1	Determine range of engineering drawings required
		2.2	Produce orthogonal drawings of mechanical components and assemblies to relevant standards using appropriate computer graphical techniques
		2.3	Produce 3-D images of mechanical components and assemblies to relevant standards using computer graphical techniques

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		2.4	Determine and apply required dimensioning, tolerancing for limits and fits, surface finish and weld symbols, and other required graphical convention information appropriate to mechanical or maintenance engineering applications
		2.5	Seek technical and professional assistance or clarification of design information, as required.
		2.6	Confirm final range of design drawings to be produced with designer, detail draftspersons and other stakeholders
3	Provide final drawings files and documents	3.1	Submit final design drawings for sign-off by designer or specified authority
		3.2	Prepare CAD files for export to detailer
		3.3	Provide documentation, drawings, data files and clearances according to job requirements and enterprise drawing management system and procedures
4	Supervise production of detail drawings	4.1	Supervise production of detail drawings

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- reviewing mechanical or maintenance engineering applications for required features, functions and context of engineering design drawings
- determining the range of design drawings required, including:
  - design drawings specified by designer and other requests (e.g. from clients and regulators)
  - models, views and sections required to indicate assembly, function, dimensions and materials
  - design drawings required to clearly indicate engineering design specifications to detailer

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- using CAD systems, comparing and selecting available software, functions and features appropriate to the design drawing task
- developing orthographic, isometric and other 3-D graphical representations
- representing mechanical components and assemblies using sketching and computer graphics
- representing mechanical components and features using a comprehensive range of standard conventions and graphical techniques
- representing a range of mechanical assemblies using standard graphical representations
- selecting and applying design criteria to meet requirements of the design brief
- engaging appropriate licensed technical and professional assistance for advice, as required, and reporting results of review and the application of graphics techniques
- providing documentation, images and files according to job and enterprise procedures

Required knowledge

Required knowledge includes:

- application of the role of engineering design, design drawing and detail drawing in mechanical and maintenance engineering tasks and projects, such as:
  - design specifications
  - mechanical and maintenance procedures
  - technical specifications and descriptions
- availability and features of standards related to mechanical plant and devices, design, maintenance and alteration
- AS 1100 Technical drawing, and means of locating and referencing other relevant standards
- availability and features of standards related to mechanical plant and devices, design, maintenance and alteration
- application of relevant standard for mechanical designs
- methods of representing mechanical components and assemblies using sketching and computer graphics, including all relevant symbols, conventions, abbreviations, and so on
- current and traditional methods of documentation generation and control:
  - computer library files
  - reference charts and catalogue information
  - manual drawing
  - generation of orthogonal images from models
- worksite procedures for the processing and filing of graphics, specifications and operating and maintenance instructions/manuals
- WHS and regulatory requirements, codes of practice, risk assessment and registration requirements relevant to mechanical and maintenance applications

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

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performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to produce a variety of graphical representations of mechanical and maintenance-related assemblies and components that are consistent with design information and relevant standards and conventions.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • select and apply design criteria to meet requirements of the deign brief • review features, functions and context of engineering drawings • develop orthographic, isometric and other 3-D graphical representations • represent mechanical components and assemblies using sketching and computer graphics • represent mechanical components and features using a comprehensive range of standard conventions and graphical techniques • represent a range of mechanical assemblies using standard graphical representations • recognise when to engage appropriate licensed technical and professional assistance for advice • provide documentation, images and files.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and

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	accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Designer	A designer is usually a professional engineer but may also be a scientist, engineering technologist, architect or other person with appropriate skills and knowledge for the design task. The term may also refer to situations where a team of designers are used to produce a design
Design drawing brief	The design drawing brief will be communicated to the design draftsperson and will include: • major and critical engineering specifications (e.g. dimensions, limits, fits, tolerances and materials) • required features and performance of equipment (e.g. volume, temperature and flow) • standards that must be adhered to • client requests • budget and project schedule

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	• procedures to be followed for further clarifications
Design drawings	Design drawings is used in this unit to include all 3-D and 2-D files and hard copies produced as part of the design drawing process

Design criteria for mechanical designs	Criteria for mechanical designs may include:
	• function
	• aesthetics
	• manufacturability and maintainability
	• marketability
	• sustainability:
	  • social, economic and environmental
	  • material and energy resources
	• cost constraints
	• ergonomics, anthropometrics and physiology
	• facilities, plant and skills available
	• safety and risk

Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • industry codes of practice • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements applying to electrical work

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Mechanical assemblies	Mechanical assemblies may include: • machines, drives and transmissions • materials handling equipment (e.g. belt conveyors, augers and pneumatic conveyors) • guards, handrails and platforms • structures, vessels and tanks • fan, ventilation, air conditioning service and ducting • manufacturing plant and process layouts • manufactured products
Mechanical components and features represented by standard conventions and graphical techniques	Mechanical components and features represented by standard conventions and graphical techniques may include: • hole basis, shaft basis and keyway tolerances and fits • dimensions, tolerances for limits and fits • materials and surface finish • weld symbols • webs, cross-sections and cutting planes • chain drives, gear sets, pulley and belt drives • threads, fasteners and springs • shafts, keyways and splines • structural sections

Features, functions and context of engineering design drawing	Features, functions and context of engineering design drawing include:
	• uses of design drafting for purposes, such as:
	  • design specifications
	  • production specifications
	  • maintenance procedures
	  • technical specifications and descriptions
	• graphical representation techniques, including orthogonal, 2-D and 3-D modelling, isometric and mechanical perspective, dimensioning, limits and fits, welding and other standard symbols
	• role of WHS and regulatory requirements, codes of practice, ministerial directives, risk assessment and registration requirements
	• availability and features of a range of standards related to mechanical plant and devices, design, maintenance and alteration
	• typical criteria for mechanical designs
	• software developments
	• current graphical methods compared with traditional methods
	• emerging developments in graphics and related engineering

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	software
Standards and codes	This refers to all relevant Australian and international standards and codes applicable to a particular design task

Unit Sector(s)

Competency field

Unit sector Drawing, drafting and design

Custom Content Section

Not applicable.

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MEM09158A Perform mechatronics engineering design drafting

Modification History

Release 1 - New unit. Replaces MEM09142A, but not equivalent.

Unit Descriptor

This unit of competency covers the preparation of design drafting for mechatronic engineering and related industry sectors. The unit includes working with a design brief or concept prepared by an engineer or other designer as well as the specification of items, functions, limits, fits, tolerances, and other engineering information required for the eventual production of fully detailed drafting. The unit requires the design drafting to be performed using appropriate computer-aided design (CAD) and other drafting techniques that include sketching, computer drafting and the application of drawing standards.

Application of the Unit

This unit applies to the undertaking of designated design tasks and the specification in mechatronic or automated plant, products, projects, and related system changes or improvements.

The design drafting is normally undertaken at the direction of an engineer, scientist or other designer who will pass on a concept brief to the design draftsperson. The concept brief may be a sketch, hard copy plan or document, or a CAD generated file. The unit requires design drafting to be produced using appropriate CAD software. Depending on the task or project, production or supervision of hard copy drawings may also be required.

The unit also includes supervision of detailed drawing production and managing of requests for further information from detailed draftspersons.

This unit may require completion of appropriate engineering design or evaluation units from the MEM05 Metal and Engineering Training Package depending on the design drafting task and previous industrial experience.

This unit does not cover the production of detailed drawings (often known as shop drawings). Where detailed drawing skills are required the relevant MEM detailed drawing units should be selected.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Clarify the design drawing task	1.1	Receive design drafting brief and check completeness of information
		1.2	Confirm software and file formats to be used for design drafting with designer and detail draftspersons
		1.3	Determine stakeholders to be consulted in design drafting process
		1.4	Assess work health and safety (WHS), regulatory, sustainability or environmental issues relevant to design task
		1.5	Confirm design drawing brief and provide preliminary advice on feasibility
2	Produce mechatronic related drawings	2.1	Determine range of engineering drawings required
		2.2	Produce orthogonal drafting of mechatronic components and assemblies to relevant standards using appropriate computer graphical techniques
		2.3	Produce 3-D images of mechatronic components and assemblies to relevant standards using computer graphical techniques
		2.4	Determine and apply required dimensioning, tolerancing for limits and fits, surface finish and weld symbols, and other required graphical convention information

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			appropriate to mechatronic engineering applications
		2.5	Produce graphical representations and circuit diagrams for fluid, electrical and electronic control systems in accordance with the design brief
		2.6	Seek technical and professional assistance or clarification of design information, as required.
		2.7	Confirm final graphical representations with professional engineering staff and other stakeholders
3	Provide final drafting, files and documents	3.1	Submit final design drawings for sign-off by designer or specified authority
		3.2	Prepare CAD files for export to detailer
		3.3	Provide documentation, drawings, data files and clearances according to job requirements and enterprise drawing management system and procedures
4	Supervise production of detail drafting	4.1	Supervise production of detail drafting

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- reviewing mechatronic engineering applications for required features, functions and context of mechatronic engineering design drawings
- determining the range of design drafting required, including:
  - design drafting specified by designer and other requests (e.g. from clients and regulators)
  - models, views and sections required to indicate assembly, function, dimensions and materials
  - design drafting required to clearly indicate engineering design specifications to detailer
- using CAD systems, comparing and selecting available software, functions and features

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appropriate to the design task
- developing orthographic, isometric and other 3-D graphical representations
- representing mechatronic components and assemblies using sketching and computer graphics
- representing mechatronic components and features using a comprehensive range of standard conventions and graphical techniques
- representing a range of mechatronic assemblies using standard graphical representations
- selecting and applying design criteria to meet requirements of the design brief
- engaging appropriate licensed technical and professional assistance for advice, as required
- providing documentation, images and files according to job and enterprise procedures

Required knowledge

Required knowledge includes:

- application of the role of engineering design, design drafting and detail drafting in mechatronic tasks and projects, such as:
  - design specifications
  - mechatronic manufacture and maintenance procedures
  - technical specifications and descriptions
  - physical arrangement of mechanical, fluid, electrical and control elements
  - diagrammatic layouts of control circuits
  - actuator sequence and logical signal diagrams
- graphical representation techniques
- WHS and regulatory requirements, codes of practice, risk assessment and registration requirements relevant to mechatronic applications
- application of relevant standards for mechatronic design
- worksite procedures for the processing and filing of drafting, specifications and operating and maintenance instructions/manuals
- methods of representing mechatronic components and assemblies using sketching and computer graphics, including all relevant symbols, conventions, abbreviations, and so on
- current and traditional methods of documentation generation and control:
  - computer library files
  - reference charts and catalogue information
  - generation of orthogonal images from models
- manual drawing

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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Overview of assessment	A person who demonstrates competency in this unit must be able to produce a variety of graphical representations of mechatronic-related assemblies and components that are consistent with design information and relevant standards and conventions.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • select and apply design criteria to meet requirements of the deign brief • review features, functions and context of mechatronic engineering drafting • develop orthographic, isometric and other 3-D graphical representations • represent mechatronic components and assemblies using sketching and computer graphics • represent mechatronic components and features using a comprehensive range of standard conventions and graphical techniques • represent a range of mechatronic assemblies using standard graphical representations • recognise when to engage appropriate licensed technical and professional assistance for advice • provide documentation, images and files.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of

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	underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Designer	A designer is usually a professional engineer but may also be a scientist, engineering technologist, architect or other person with appropriate skills and knowledge for the design task. The term may also refer to situations where a team of designers are used to produce a design
Design drawing brief	The design drawing brief will be communicated to the design draftsperson and will include: • major and critical engineering specifications (e.g. dimensions, limits, fits, tolerances and materials) • required features and performance of equipment (e.g. volume, temperature and flow) • control requirements and control methods • electrical and fluid power specifications • standards that must be adhered to • client requests • budget and project schedule

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	• procedures to be followed for further clarifications
Design drawings	Design drawings is used in this unit to include all 3-D and 2-D files and hard copies produced as part of the design drawing process

Design criteria for mechatronic designs	Criteria for mechatronic designs may include:
	• function
	• aesthetics
	• manufacturability and maintainability
	• marketability
	• sustainability:
	  • social, economic and environmental
	  • material and energy resources
	• cost constraints
	• ergonomics, anthropometrics and physiology
	• facilities, plant and skills available
	• automation safety and risk

Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

Features, functions and context of engineering design drafting	Features, functions and context of engineering design drafting includes:
	• uses of design drafting for purposes, such as:
	  • design specifications
	  • production specifications
	  • maintenance procedures
	  • technical specifications and descriptions
	• graphical representation techniques, including orthogonal,

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	2-D and 3-D modelling, isometric and mechanical perspective, dimensioning, limits and fits, welding and other standard symbols • role of WHS and regulatory requirements, codes of practice, ministerial directives, risk assessment and registration requirements • availability and features of a range of standards related to mechanical plant and devices, design, maintenance and alteration • typical criteria for mechatronic designs • software developments • emerging developments in graphics and related engineering software
Mechatronic components and features represented by standard conventions and graphical techniques	Mechatronic components and features represented by standard conventions and graphical techniques may include: • hole basis, shaft basis and keyway tolerances and fits • dimensioning, tolerancing for limits and fits • materials and surface finish • weld symbols • webs, cross-sections and cutting planes • chain drives, gear sets, pulley and belt drives • threads, fasteners and springs • shafts, keyways and splines • structural sections • surface finishes and welds • electric motors and fluid power actuators • electrical, electronic, electro fluid controls • electrical and electronic circuit components
Mechatronic assemblies	Mechatronic assemblies may include: • robots • automated mechanisms and machines • materials handling equipment (e.g. belt conveyors, augers and pneumatic conveyors) • fan, ventilation, air conditioning service and ducting • manufacturing plant and process layouts • manufactured product with embedded controller • automated machines, drives and transmissions • automated materials handling equipment (e.g. belt conveyors, augers and pneumatic conveyors) • guards, handrails and platforms for automated systems • automated fan, ventilation and air conditioning systems • automated manufacturing plant and process layouts

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	• mechatronic devices and products
WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • industry codes of practice • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements applying to electrical work
Standards and codes	This refers to all relevant Australian and international standards and codes applicable to a particular design task

Unit Sector(s)

Competency field

Unit sector Drawing, drafting and design

Custom Content Section

Not applicable.

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MEM09204A Produce basic engineering detail drawings

Modification History

Release 1 - New unit of competency

Unit Descriptor

This unit of competency covers the skills and knowledge required to identify drawing requirements, preparing engineering drawings and an engineering parts list, and issuing the drawings. Drawings include 2-D drawings to Australian Standard (AS) 1100.101–1992 Technical drawing – General principles.

Application of the Unit

This unit is suitable for those working within a drafting work environment where most specifications required for the drawing are already determined. Specifications may be obtained from design information, customer requirements, sketches and preliminary layouts. Drawings will usually be carried out with the use of computer-aided design (CAD) systems but may also be done manually. Drawings are produced to AS 1100.101–1992 Technical drawing – General principles, from predetermined critical dimensions and specifications.

If a CAD system is used, the unit MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements, should also be selected.

This unit applies to all engineering and manufacturing environments.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Pre-Requisites

MEM09002B Interpret technical drawing

Employability Skills Information

This unit contains employability skills

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Determine drawing requirements	1.1	Check purpose, scope and information requirements for drawing
		1.2	Interpret available information relevant to project and work requirements, and identify and address further information needs
		1.3	Identify and prepare equipment required to complete work
		1.4	Examine requirements for presentation of drawings
		1.5	Confirm communication requirements during project
2	Produce detail drawing	2.1	Prepare drawings in plane orthogonal, or equivalent
		2.2	Apply standard drawing conventions, including dimensions, required method of projection, and full notation
		2.3	Use drawing techniques according to work requirements
		2.4	Apply industry symbols and ensure presentation meets industry standard
3	Prepare engineering parts list	3.1	Identify components or parts and organise by component type and/or in accordance with organisation/customer requirements
		3.2	Prepare parts list in accordance with organisation/customer requirements

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4	Complete drawing task	4.1	Check and confirm dimensions, angles and proportions
		4.2	Ensure drawing is presented according to organisational requirements and contains all relevant and accurate information
		4.3	Issue and file drawing according to workplace procedure
		4.4	Evaluate work and identify areas for improvement
		4.5	Plot or print the final drawing to a standard scale

Required Skills and Knowledge

Required skills

Required skills include:

- literacy skills sufficient to read and interpret instructions and specifications for drawing work
- obtaining all relevant job requirements, data/information and specifications necessary to produce the drawing in accordance with workplace procedures
- planning and sequencing operations
- checking and clarifying task-related information
- using computer technologies and navigating software
- numeracy skills sufficient to interpret technical information and conduct mathematical problem solving as required in the scope of this unit
- applying spatial principles to achieve scale and proportion
- using drafting equipment appropriate to the drawing method chosen
- recording completed drawings and/or parts lists in accordance with standard operating procedures
- handling and storing the approved drawings and/or parts lists in accordance with standard operating procedures

Required knowledge

Required knowledge includes:

- general knowledge of different approaches to drawing
- awareness of copyright and intellectual property issues and legislation in relation to drawing
- environmental and occupational health and safety (OHS) issues associated with the tools and materials used for drawing
- quality assurance procedures

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- principles of plane geometry:
  - geometric shapes
  - plane geometry
  - geometric construction
  - line types during construction
- drawing construction:
  - four centre method
  - ordinate method
  - sectioning isometric shapes
  - dimensions and notations
- requirements and purpose of the drawing to be produced
- requirements and purpose of the engineering parts list
- sources of relevant data/information
- timeframe for completion of drawings
- persons who can confirm drawing requirements

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria required skills and knowledge range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to use interpret and apply drawing specifications, and produce a complete drawing to AS 1100.101–1992 Technical drawing – General principles, using manual or CAD tools.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts. Specifically the candidate must be able to: • work within typical site/teamwork structures and methods • apply worksite communication procedures • comply with organisational policies and procedures, including quality requirements

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	• participate in work meetings • comply with quality requirements • use industry terminology • apply appropriate safety procedures • interpret work and design specifications and use reference material to obtain required information for drawing work • produce a detailed engineering drawing to AS 1100.101–1992 Technical drawing – General principles, and according to work requirements.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with drafting or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways, including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards,

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	manuals and reference materials.

Range Statement

Standard drawing conventions	Standard drawing conventions include: • use of correct sectioning technique • identification of cutting plane • accurate line types • appropriate view positions • use of correct symbols • use of correct dimensioning technique • provision of suitable number of views • use of correct scales • neat presentation

Drawing techniques	Drawing techniques may include:
	• orthogonal projection:
	  • first angle projection
	  • third angle projection
	  • projection symbol
	  • preferred system of projection in Australia
	  • number of views
	  • relationship of views
	• sheet format:
	  • borders and title blocks
	  • application of projection symbol
	  • drawing sheets and sizes
	  • lettering styles
	  • Australian Standards
	• dimensioning:
	  • unidirectional dimensioning
	  • aligned dimensioning
	  • projection and dimension lines
	  • arrow heads
	  • dimension placement
	• scale drawing:
	  • recommended scales
	  • reduction scales
	  • enlargement scales

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	• multiple scales • dimensioning techniques of scale drawings • sectioning: • types of sections • required section views • placement of views • cutting planes • labelling of cutting planes and section views • general notes

Unit Sector(s)

Drawing, drafting and design

Custom Content Section

Not applicable.

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MEM09205A Produce electrical schematic drawings

Modification History

Release 1 - New unit of competency

Unit Descriptor

This unit of competency covers the skills and knowledge required to produce electrical schematic drawings to comply with Australian Standard (AS) 1102.101–1989 Graphical symbols for electrotechnical documentation – General information and general index, or equivalent, using predetermined design specifications. The unit also covers the production of layout or block diagrams to show the physical arrangement of components.

Application of the Unit

This unit is suitable for those working within a drafting work environment. The unit applies to the production of schematic drawings to show electrical circuits and connections between devices, including power and signal connections. It includes the use of appropriate symbols and production of a matching reference list of circuit components. Types of electrical drawings or diagrams may include block, single line, interconnecting, wiring, circuit, telephonic and telegraphic or cable form diagrams, and notations.

Drawings may be carried out with or without the use of computer-aided design (CAD) systems and are completed to AS 1102.101–1989 Graphical symbols for electrotechnical documentation – General information and general index, or equivalent.

If CAD systems are to be used, the unit MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements, should also be selected.

Drawings are completed under supervision.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Pre-Requisites

MEM09002B	Interpret technical drawing
MEM09204A	Produce basic engineering detail drawings

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Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Determine schematic drawing requirements	1.1	Check purpose, scope and information requirements for drawing
		1.2	Interpret available information relevant to project and work requirements, and identify and address further information needs
		1.3	Identify and prepare equipment required to complete work
		1.4	Identify and access organisational files, templates and symbols as required for work
2	Identify system requirements	2.1	Identify and apply relevant codes, standards and symbols used for electrical diagrams and drawings
		2.2	Identify function and purpose of circuit and its components and assemblies
		2.3	Identify environmental implications of inefficient systems and strategies for minimising impact
3	Prepare electrical drawings and diagrams	3.1	Lay out drawing in accordance with the sketches and specifications
		3.2	Prepare an electrical block diagram in accordance with Australian Standards

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		3.3	Draw cable run and riser diagrams from schedules
		3.4	Produce switchboard layout drawings
		3.5	Prepare single line and interconnecting electrical diagrams in accordance with Australian Standards
		3.6	Prepare wiring and circuit diagrams in accordance with Australian Standards
		3.7	Ensure drawing accurately reflects specifications, is presented according to organisational requirements and contains all relevant information, including correct line work, scales, notation and dimensioning
		3.8	Apply workplace occupational health and safety (OHS) and environmental procedures
4	Prepare materials list	4.1	Where required, select components and/or materials from supplier/manufacturer catalogues using predetermined specifications
		4.2	Produce a parts list in accordance with workplace procedures
		4.3	Store drawings and/or materials list according to workplace procedures
5	Consult appropriately with other disciplines	5.1	Verify the parameters of the brief and clarify specifications with appropriate personnel
		5.2	Identify and consult with support services
		5.3	Present and explain drawings at appropriate stages of the project

Required Skills and Knowledge

Required skills

Required skills include:

- literacy skills sufficient to read and interpret instructions, relevant codes of practice and

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specifications for drawings work
- using computer technologies and navigating software
- numeracy skills sufficient to interpret technical information and conduct mathematical problem solving as required in the scope of this unit
- using and maintaining drawing equipment
- applying spatial principles to achieve scale and proportion
- interpersonal skills to consult with other disciplines
- drafting skills
- applying symbols, schedules and legends to the drawing
- arranging the views in a logical manner and in accordance with AS 1102.101–1989 Graphical symbols for electrotechnical documentation – General information and general index, or equivalent
- correctly using line thickness and construction to identify parts
- using engineering and manufacturer catalogues, tables, standards and specifications
- drawing electrical/electronic schematics correctly and indicating the relative position of the components
- producing electrical/electronic drawings with all relevant specifications
- obtaining the circuit/component specifications
- planning and sequencing operations
- checking and clarifying task related information
- filing drawings according to workplace procedures

Required knowledge

Required knowledge includes:

- general knowledge of different approaches to drawing
- awareness of copyright and intellectual property issues and legislation in relation to drawing
- requirements of AS 1102.101–1989 Graphical symbols for electrotechnical documentation – General information and general index, or equivalent with respect to electrical/electronic schematics/drawings
- environmental and OHS issues associated with the tools and materials used for drawing
- quality assurance procedures
- company standards for CAD
- order of drawing process
- company checking procedures for drawings
- layout and presentation
- the standards applicable to the work to be undertaken
- the process of checking the completed drawing
- the process of storing paper drawings and electronic drawing files
- the International System of Units (SI)
- terminology associated with the preparation of electrical diagrams and drawings

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- basic components used in electrical installations
- wiring types used in electrical installations
- functions of components, such as:
  - resistors
  - capacitors

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria required skills and knowledge range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to interpret and apply drawing specifications in the production of electrical diagrams and drawings to Australian Standard AS1102.101–1989 Graphical symbols for electrotechnical documentation – General information and general index, or equivalent.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts. Specifically the candidate must be able to: • work within typical site/teamwork structures and methods • apply worksite communication procedures • comply with organisational policies and procedures, including quality requirements • participate in work meetings • comply with quality requirements • use industry terminology • apply appropriate safety procedures • obtain required information for work and produce detailed electrical/electronic schematic drawings in accordance with AS1102.101–1989 Graphical symbols for electrotechnical documentation – General information and general index, or similar.
Context of and specific resources	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where

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for assessment	assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with drafting or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways, including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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Range Statement

Available information	Available information may include: • construction documents • building and coordination information • work specifications • information for plant services equipment • industry codes, standards and regulations • catalogues and manuals • design brief
Components and assemblies	Components and assemblies may include: • resistors: fixed (composition and wire wound), variable (rheostats, potentiometers and trimmers),and non-linear (thermistors) • capacitors: fixed (ceramic, plastic and electrolytic), variable, magnetic, transformers, chokes, relays, contactors, rectifiers, smoothing filters, voltage regulators and feedback
Electrical layouts	Electrical layouts may include: • domestic lighting • domestic power • commercial • lighting schedule • power schedule • factory electrification • flame proofing • buzz bar systems • 3 phase • 240 V and 415 V
Cable runs	Cable runs may include: • racking • schedules
Riser diagrams	Riser diagrams may include: • multi-storey
Switchboards	Switchboards may include: • layouts • wiring schedules
Appropriate personnel	Appropriate personnel may include: • designer

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	• engineer • supervisor • contractor/consultant • builder
Support services	Support services may include: • estimating department and personnel • engineering department and personnel • drafting department and personnel • project manager • factory manager or staff

Unit Sector(s)

Drawing, drafting and design

Custom Content Section

Not applicable.

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MEM09210A Create 3-D solid models using computer-aided design (CAD) system

Modification History

Release 1 - New unit of competency

Unit Descriptor

This unit covers preparing the 3-D computer-aided drafting (CAD) environment, creating and modifying 3-D solid models, and producing output from the 3-D model.

Application of the Unit

This unit is suitable for those working within a drafting work environment and may be applied across a range of engineering disciplines. This unit applies to the production of 3-D solid models using CAD modelling software. Operations at this level include, but are not limited to, the creation and manipulation of entities, such as arcs, lines and primitives, such as spheres, cones, cylinders and boxes. It includes the use of region and solid modelling techniques, section views, and pre-drawn library files. Work also includes extraction of properties and application of basic rendering techniques.

This unit includes applications in CAD, computer graphics and animation, rapid prototyping, medical testing and visualisation of scientific research.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Pre-Requisites

MEM09002B	Interpret technical drawing
MEM30031A	Operate computer-aided design (CAD) system to produce basic drawing elements

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Determine solid modelling requirements	1.1	Check purpose, scope and information requirements for modelling task
		1.2	Interpret available information relevant to project and work requirements, and identify and address further information needs
		1.3	Identify and prepare equipment required to complete work
		1.4	Identify and apply relevant codes, standards and symbols relevant to work
		1.5	Consult appropriate personnel to ensure the work is coordinated effectively with others involved in the project
		1.6	Obtain and apply workplace occupational health and safety (OHS) and environmental procedures for work
2	Prepare 3-D environment	2.1	Apply workplace procedures to retrieve and manipulate required information and navigate computing technology
		2.2	Set up a 3-D environment on the screen to allow multiple viewing
		2.3	Create 3-D views on the screen by manipulating drawing planes and inserting 3-D geometric shapes
		2.4	Establish coordinate system and orientation according to job requirements
		2.5	Determine and exploit key features of solid modelling software package

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3	Produce output from 3-D model	3.1	Perform drawing for solid modelling
		3.2	Exploit features of modelling software to optimise productivity
		3.3	Extract physical properties to job requirement, including volume, mass and centre of gravity
		3.4	Apply rendering techniques
		3.5	Produce 3-D drawings incorporating section views with all necessary annotation
4	Complete CAD operations	4.1	Confirm model accurately reflects specifications, is presented according to work requirements and contains all relevant information
		4.2	Save and file drawing elements according to organisational procedure
		4.3	Evaluate work and identify areas for improvement
		4.4	Close applications, perform CAD housekeeping and maintain organisational filing system

Required Skills and Knowledge

Required skills

Required skills include:

- using computing technologies and navigating software
- obtaining relevant job instructions and specifications
- creating the appropriate entities in 3-D space
- manipulating the entities in 3-D space
- creating swept, extruded and revolved solids in 3-D space
- modifying, where appropriate, existing 3-D models
- saving drawing files in the appropriate format
- extracting the physical properties of shapes created in 3-D space from the drawing file to meet job requirements
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable

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reference documents
- checking and clarifying task-related information
- checking for conformance to specifications
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit
- creating intelligent models using parametric modelling
- producing composite models (composite regions and composite solids)
- producing sectioned models (cutting planes and cross hatching)
- using pre-drawn library files and primitives to produce a 3-D model
- extracting mass and area properties from solid model
- applying rendering techniques to a 3D model (rendering types and preferences, render lighting techniques, and views and scenes)
- using various materials and surface finish options
- producing hard copies of 3-D solid models
- saving 3-D models in various file formats for retrieval into other CAD application software
- producing orthogonal detail drawings of components on standard drawing sheets to a recognised drafting scale

Required knowledge

Required knowledge includes:

- purpose for which the 3-D model is to be developed
- appropriate coordinate system for the job
- reasons for selecting the chosen coordinate system
- orientation of the model with respect to the coordinate system
- number of views required to establish the model
- procedures for creating entities in 3-D space
- the entities that can be created/manipulated in 3-D space
- procedures for manipulating entities in 3-D space
- procedures for creating swept, extruded and revolved solids in 3-D space
- applications of swept, extruded and revolved solids
- procedures for modifying existing 3-D models
- rendering types and preferences, render lighting techniques, views and scenes
- procedures for saving drawing files
- the various formats in which drawing files can be saved
- reasons for using different formats when saving drawing files
- procedures for extracting data with respect to the physical properties of shapes created in 3-D space
- the physical properties of shapes created in 3-D space that can be extracted from the drawing file
- hazard and control measures associated with using CAD system, including housekeeping
- safe work practices and procedures
- terminology associated with solid modelling (region modelling, solid modelling, and

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wire frame, as opposed to solids)
- region modelling techniques (creating a region primitive and editing regions)
- solid modelling techniques (creating solid primitives, editing solid primitives, and conversion from region to solid models)

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria required skills and knowledge range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to create 3-D models using CAD systems.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts. Specifically the candidate must be able to: • work within typical site/teamwork structures and methods • apply worksite communication procedures • comply with organisational policies and procedures, including quality requirements • participate in work meetings • comply with quality requirements • use industry terminology • apply appropriate safety procedures • select and use 3-D CAD software to create solid models that meet design specifications.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

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	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with creating 3-D models using CAD systems or other units requiring the exercise of the skills and knowledge covered by this unit
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways, including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Range Statement

Solid modelling task	Solid modelling task may include: • terminology • region modelling • solid modelling • parametric modelling • composite models • section models • library files and 3-D primitives • other relevant software packages for the production of 3-D models • mass and area properties • rendering techniques • material finishes • production of hard copies • saving and retrieval of files of varying formats • consolidation (e.g. project work)
Rendering techniques	Rendering techniques may include: • rendering types and preferences • render lighting techniques

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	• views and scenes
Appropriate personnel	Appropriate personnel may include: • supervisor • leading hand • foreman • manager • site engineer • trainer • mentor • teacher • team member
OHS requirements	OHS requirements may include: • legislation • personal protective equipment • material safety management systems • hazardous substances and dangerous goods code • awards provisions • safe work practices
Environmental requirements	Environmental requirements may refer to: • liquid waste • solid waste • gas, fume, vapour, and smoke emissions, including fugitive emissions • excessive energy and water use • excessive noise
Resource requirements	Resource requirements may include: • computer software • stationary • software reference documentation • reference texts • consumables • computer • printing equipment

Unit Sector(s)

Drawing, drafting and design

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Custom Content Section

Not applicable.

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MEM09216A Interpret and produce curved 3-D shapes and patterns

Modification History

Release 1 - New unit of competency

Unit Descriptor

This unit of competency covers producing and interpreting lines and plan drawings using manual or computer-aided design (CAD) or drafting techniques.

Application of the Unit

This unit applies to drawing and lofting principles relevant to procedures used to produce lines, plan drawings and loftings. Common applications of this unit are in marine vessel construction.

In a marine setting, tasks may be related to a variety of hull designs; section development, such as curved and raking transom; conical development and camber development methods. General arrangement plans may also be addressed to provide a greater drawing diversity.

All drawings/data should comply with industry requirements.

Straightforward take-offs from lofted drawings is covered by MEM12007D Mark off/out structural fabrications and shapes. Also, where transfer of lines to lofting floor or other surface is carried out, MEM12007D Mark off/out structural fabrications and shapes, should be selected in addition to this unit.

If a CAD system is used, the unit MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements, should also be selected.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Determine drawing/lofting requirements	1.1	Check purpose, scope and information requirements for task
		1.2	Interpret available information relevant to project and work requirements, and identify and address further information needs
		1.3	Identify and prepare equipment required to complete work
		1.4	Identify and apply relevant codes, standards and symbols relevant to work
		1.5	Consult appropriate personnel to ensure the work is coordinated effectively with others involved in the project
		1.6	Obtain and apply workplace occupational health and safety (OHS) and environmental procedures for work
2	Apply drawing/lofting procedures	2.1	Apply workplace procedures to retrieve and apply required information
		2.2	Set up drawing equipment and accessories to suit job requirements
		2.3	Identify and apply drafting/lofting procedures to suit specified drawing requirements
		2.4	Record alterations required to offset measurements, as applicable
		2.5	Produce drawings/loftings that are consistent with work and industry requirements

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3	Submit lines and plan drawings	3.1	Ensure work meets specifications and submit drawings according to workplace procedures
		3.2	Where applicable, supply altered offset measurements and relevant information related to drawing

Required Skills and Knowledge

Required skills

Required skills include:

- reading, interpreting and following information on written job instructions, specifications, client briefings, standard operating procedures, charts, lists, drawings and other applicable reference documents
- analysing and organising information, and planning and sequencing operations
- checking and clarifying task-related information
- checking for conformance to specifications
- measuring and performing computations, including geometric and numerical calculations/formulae within the scope of this unit
- drawing and sketching skills to create 3-D drawings
- applying spatial principles to achieve scale and proportion
- using and maintaining drawing equipment
- applying symbols, schedules and legends to the drawing
- presenting drawing according to industry standard, complete with all required information
- handling and storing drawings according to workplace practice

Required knowledge

Required knowledge includes:

- hazards and control measures associated with interpreting and producing curved 3-D shapes, including housekeeping
- safe work practices and procedures
- vessel design characteristics, including performance, stability and construction methods
- spatial concepts
- procedures used to produce lines, plan drawings and loftings
- drawing principles and conventions
- section development, such as curved and raking transom, conical development and camber development methods
- presentation requirements for completed work

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria required skills and knowledge range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

A person who demonstrates competency in this unit must be able to interpret and produce curved 3-D shapes.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Specifically the candidate must be able to:

- work within typical site/teamwork structures and methods
- apply worksite communication procedures
- comply with organisational policies and procedures, including quality requirements
- participate in and supervise work meetings
- monitor and supervise progress of detail drafting work and provide support to team members as required
- comply with quality requirements
- use industry terminology
- apply appropriate safety procedures
- interpret and produce curved 3-D shapes and patterns.

Context of and specific resources for assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and

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	reporting associated with interpreting and producing curved 3-D shapes or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways, including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Range Statement

Not applicable.

Unit Sector(s)

Drawing, drafting and design

Custom Content Section

Not applicable.

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MEM10002B Terminate and connect electrical wiring

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers terminating, disconnecting or reconnecting electrical wiring and circuits.

Application of the Unit

Application of the unit	This unit applies to the connection of wiring and includes termination and connection of all types of cords and cables, excluding specialist cables. All testing is undertaken on completed circuits where these are not connected to main supply, using appropriate methods such as continuity and resistance checks. Specifications are obtained from electrical/electronic circuit drawings and data sheets. Soldering/desoldering of electrical/electronic components may also require the selection of Unit MEM05001B (Perform manual soldering/desoldering - electrical/electronic components) or Unit MEM05002B (Perform high reliability soldering and desoldering) as applicable. This unit does not cover the competencies required for energising and testing of the circuit. If these skills are required, the competencies covered in Unit MEM10003B (Install and test electrical wiring and circuits up to 1000 volts a.c. and 1500 volts d.c.) must be satisfied. Termination and connection of specialist cables such as mineral insulated, steel wire, armoured cables etc., is covered in Unit MEM10011B (Terminate and connect specialist cables). **Band**: **A**

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	Unit Weight: **3**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12002B	Perform electrical/electronic measurement
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for electrical wiring termination and connection	1.1. All work is undertaken safely and to workplace procedures and State/Territory regulations and legislative requirements. 1.2. Materials are checked for correct specifications. 1.3. Preparation of work is undertaken or checked/inspected for correct location and specifications.
2. Connect electrical wiring	2.1. Terminations/connections are made to specifications, manufacturers' requirements and to safety and State/Territory regulations and legislative requirements. 2.2. All brackets, clamps, holders etc. are adjusted and fixed to specifications. 2.3. All cables, wires, conductors and connections etc. are marked/tagged and labelled to specification. 2.4. All completed wiring and connections are tested for compliance with specifications. 2.5. All reports and documentation are completed correctly to required specifications.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- checking materials for conformance to specifications
- checking existing and new installation site for correct location and specification
- making terminations/connections to specification, manufacturer and regulatory requirements
- adjusting and fixing wiring supports
- marking, tagging and labelling cables, wires, conductors and connections to specification
- undertaking testing of wiring and connections for conformance to specification
- using language and literacy skills to complete short reports and required

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REQUIRED SKILLS AND KNOWLEDGE
documentation • reading and interpreting routine information on written job instructions, specifications and standard operating procedures May include drawings • using measurements for checking connections and components
Required knowledge
Look for evidence that confirms knowledge of: • safety hazards associated with the termination and connection of electrical wiring • statutory and regulatory requirements associated with the termination and connection of electrical wiring • wiring support and/or protection requirements and specifications • relevant manufacturer requirements • specifications and methods for terminating different materials • wiring support techniques and alternatives • marking, tagging and labelling requirements for cables, wires, conductors and connections • tests for wiring and connections • data to be recorded/reported and the frequency of recording/reporting • requirements for approval to work • use and application of personal protective equipment for terminating and connecting electrical wiring

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to terminate and connect electrical wiring. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency

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EVIDENCE GUIDE	
	in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with terminating and connecting electrical wiring or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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RANGE STATEMENT	
situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
State/Territory regulations and legislative requirements	Applicable acts, regulations, codes of practice, Australian standards, International standards
Correct location and specifications	Cable trays, brackets, trenches
Electrical wiring	Wiring associated with power, lighting, control wiring, machinery, switchboards and other electrical apparatus
Terminations/connections	Utilisation of a range of methods including clamping, crimping, pin connection, soldered joints, plugs, sockets etc., clamping of cables and wires, sealing entry points where required

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Installation and commissioning

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MEM11001C Erect/dismantle scaffolding and equipment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers erecting and dismantling scaffolding and equipment.

Application of the Unit

Application of the unit	This unit applies to erecting scaffolding for maintenance and installation in a workshop and in factories, manufacturing plants and warehouses. It includes preparation, erection and dismantling of the scaffolding/equipment. An awareness of licensing and permit requirements is required. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Refer to Application of the Unit

Pre-Requisites

Prerequisite units		
Path 1	MEM18001C	Use hand tools

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare to erect scaffold/equipment	1.1. Site plans, scaffolding/equipment designs and drawings to industry practices are interpreted as necessary. 1.2. Work area is inspected to identify hazards and appropriate prevention/control measures are implemented to avoid hazard. 1.3. All work is undertaken safely and to prescribed procedures.
2. Erect scaffold/equipment	2.1. Erection site is prepared to meet job requirements. 2.2. Necessary signage and barriers and third party protection measures are placed in appropriate position. 2.3. Appropriate scaffolding/equipment components are selected and inspected and damaged components are labelled and rejected. 2.4. Rejected components are repaired or sent for repair. 2.5. Scaffolding/equipment is erected to plan and in accordance with safe work practices, Australian standards, State and Territory legislative requirements and equipment manufacturers' requirements.

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ELEMENT	PERFORMANCE CRITERIA
	2.6. The completed scaffolding/equipment is checked for safety and operational requirements. 2.7. Site is left clear of all surplus components, equipment, tools and debris.
3. Inspect, repair and alter scaffold/equipment	3.1. The scaffolding/equipment is inspected for damage, corrosion and wear. 3.2. Any alteration or repair is carried out in accordance with safe work practices and legislative requirements. 3.3. Any inspection log is completed as required.
4. Dismantle scaffold/equipment	4.1. Work is undertaken safely and to prescribed procedure. 4.2. Scaffolding/equipment is inspected for damage, corrosion or wear and is noted for consideration in planning for dismantling. 4.3. Scaffolding/equipment is dismantled in accordance with site procedures, State and Territory legislative requirements and critical structural and safety requirements. 4.4. Site is cleaned and cleared of all tools, excess material and debris and left in a safe state.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading and interpreting routine information on written job instructions, specifications and standard procedures. May include drawings for erecting scaffolding
- undertaking basic levelling and alignment
- interpreting instructions and legislative requirements
- using relevant hand tools and manual handling techniques
- assessing risk
- following oral instructions

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REQUIRED SKILLS AND KNOWLEDGE
• working safely and confidently at heights
Required knowledge
Look for evidence that confirms knowledge of: • erection and dismantling procedures as set out in relevant Australian standards • codes of practice, for example the Scaffolder's Guide, relevant acts and regulations • site specific requirements • safety procedures, safe work practices and procedures • use and application of personal protective equipment • hazards and control measures associated with erecting/dismantling scaffolding and equipment, including housekeeping • scaffolding techniques and equipment • limitations of equipment • materials handling, storage and environmentally friendly waste management

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to erect and dismantle scaffolding/equipment safely subject to legislative requirements. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic

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EVIDENCE GUIDE	
	workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with erection and dismantling of scaffolding or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required and must be permitted to refer to any relevant workplace procedures, codes, specifications, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Scaffolding/equipment	• Prefabricated tower scaffolds, fall protection devices, catch platforms and bracket scaffolds (tank and formwork), mobile scaffolds, gin wheels, cantilevered hoist with a load limit not exceeding 500 kilograms (material only),

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RANGE STATEMENT	
	safety nets and static lines • The major difference between basic and complex scaffolding is the height of the working platform and certain types of scaffolding and configurations
Hazards	• Chemicals, dangerous or hazardous substances/materials • Movement of equipment, goods, materials, vehicular traffic • Uneven/unstable terrain, overhead service lines, trees, underground services, obstructions, structures, surrounding buildings, facilities, bridges/walkways, lifting equipment
Prescribed procedures	• Clarification of instructions and/or plans either written or from authorised personnel • Site safety policy and procedures • Standard operating procedures • Correct use of equipment • Industry standards and requirements • Manufacturers' specifications
Signage and barriers and third party protection measures	• Physical barriers (parawebbing, bollards, timber or metal barriers) • Warning/direction signs • Personnel to restrict unauthorised access (spotters) • Permits to work
Safe work practices	Hazard identification, risk assessment, risk reduction measures, house keeping and personal protective equipment
State and Territory legislative requirements	• Appropriate OHS and Scaffolding acts and regulations • Australian standards, codes of practice and NOHSC:1006

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Materials handling

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MEM11002C Erect/dismantle complex scaffolding and equipment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers erecting, maintaining, inspecting/altering/repairing and dismantling complex scaffolding/equipment.

Application of the Unit

Application of the unit	This unit applies to erecting complex scaffolding to be used generally in maintenance and installation in a workshop, and in factories, manufacturing plants and warehouses. It includes preparation, erection, maintenance, inspection/repair/alteration and dismantling of the scaffolding/equipment. An awareness of licensing and permit requirements is required. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Refer to Application of the Unit

Pre-Requisites

Prerequisite units		
Path 1	MEM11001C	Erect/dismantle scaffolding and equipment

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Prerequisite units		
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare to erect scaffold/equipment	1.1. Site plans, scaffolding/equipment designs and drawings to industry practices are interpreted as necessary. 1.2. Work area is inspected to identify hazards and appropriate prevention/control measures are implemented to avoid hazard. 1.3. All work is undertaken safely and to prescribed procedures.
2. Erect scaffold/equipment	2.1. Erection site is prepared to meet job requirements. 2.2. Necessary signage and barriers and third party protection measures are placed in appropriate position. 2.3. Appropriate scaffolding/equipment components are selected and inspected and damaged components are labelled and rejected.

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ELEMENT	PERFORMANCE CRITERIA
	2.4. Rejected components are repaired or sent for repair. 2.5. Scaffolding/equipment is erected to plan and in accordance with acceptable safe work practices, Australian standards, State or Territory legislative requirements and equipment manufacturers' requirements. 2.6. Scaffolding/equipment is checked for safety and operational requirements and faults are identified in accordance with legislative requirements.
3. Inspect, alter and/or repair scaffold/equipment	3.1. Alterations/repairs are confirmed in accordance with safety work practices, Australian standards and equipment manufacturers' requirements. 3.2. Alterations/repairs are inspected for safety and operational requirements. 3.3. Scope of alteration/repair is confirmed and understood. 3.4. Existing scaffold/equipment is inspected for suitability of alterations/repair requirements. 3.5. Materials, equipment and tools required for alteration are determined. 3.6. Work completion is recorded/reported to appropriate authority.
4. Dismantle scaffold/equipment	4.1. Work is undertaken safely and to prescribed procedure. 4.2. Scaffolding/equipment is inspected for damage, corrosion or wear and is noted for consideration in planning for dismantling. 4.3. Scaffolding/equipment is dismantled in accordance with site procedures, State and Territory legislative requirements and critical structural and safety requirements. 4.4. Site is cleaned and cleared of all tools, excess material and debris and left in a safe state.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE
Required skills
Look for evidence that confirms skills in: • levelling and aligning scaffolding • interpreting instructions and legislative requirements • using basic hand tools • assessing risk in relation to complex scaffolding erection • using manual handling techniques • undertaking site clean up and remediation • working safely and confidently at heights
Required knowledge
Look for evidence that confirms knowledge of: • erection and dismantling procedures as set in relevant Australian standards • codes of practice, for example the Scaffolder's Guide, relevant acts and regulations • site specific requirements • safety procedures, safe work practices and procedures • sequence of operations in erecting the scaffolding • types of scaffolding systems • hazards and control measures; electrical, stability, mobile plant issues/requirements; falls protection measures; minimum gap requirements; safe access and egress • deck loadings • use and application of personal protective equipment • scaffolding techniques and equipment • limitations of equipment • materials handling, storage and environmentally friendly waste management

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to erect, maintain and dismantle complex

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EVIDENCE GUIDE	
	scaffolding/equipment safely and subject to legislative requirements. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with erection, maintenance and dismantling of complex scaffolding or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Scaffolding/equipment	• Prefabricated tower scaffolds, tube and fitting scaffolds as limited by legislative requirements, tube and coupler scaffolds including tube and coupler covered ways and gantries, fall protection devices, catch platforms, bracket scaffolds (tank and formwork), mobile scaffolds, ropes, cantilevered hoists, cantilevered and spurred scaffolds, cantilever crane loading platforms and course-ways, fall protection devices, platforms • Complex scaffolding means Intermediate Scaffolding and above as set out in the legislative requirements in each State and Territory. The major difference between complex and basic scaffolding is the height of the working platform and certain types of scaffolding and configurations • Maintaining scaffolding means ensuring that the scaffolding remains in a safe condition according to manufacturers' specifications and legislative requirements
Hazards	• Chemicals, dangerous or hazardous substances/materials • Movement of equipment, goods, materials, vehicular traffic • Uneven/unstable terrain, overhead service lines, trees, underground services, obstructions, structures, surrounding buildings, facilities, bridges/walkways, lifting equipment
Prescribed procedures may include	• Clarification of instructions either written or from authorised personnel • Site safety policy and procedures • Standard operating procedures • Correct use of equipment

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RANGE STATEMENT	
	• Industry standards and requirements • Manufacturers' specifications
Signage, barriers and third party protection measures may include	• Physical barriers (parawebbing, bollards, timber or metal) • Warning/direction signs • Personnel to restrict unauthorised access (spotters) • Permits to work
Safe work practices may include	Hazard identification, risk assessment, standard operating procedures, house keeping and personal protective equipment.
State or Territory legislative requirements	• Appropriate OH&S and Scaffolding acts and regulations. • Australian standards and codes of practice and • NOHSC:1006

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Materials handling

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MEM11003B Coordinate erection/dismantling of complex scaffolding/equipment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers coordinating the erection, alteration, repair and dismantling of scaffolding/equipment, and inspecting the completed scaffold/equipment.

Application of the Unit

Application of the unit	This unit applies to individuals coordinating a scaffolding team or employed in a supervisory capacity for the erection, maintenance and dismantling of scaffolding and equipment in a workshop, and in factories, manufacturing plants and warehouses. If specific skills are required for the repair of the scaffolding, personnel with appropriate competencies are accessed. Licensing and permit requirements are addressed accordingly. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Refer to Application of the Unit

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Pre-Requisites

Prerequisite units		
Path 1	MEM11001C	Erect/dismantle scaffolding and equipment
	MEM11002C	Erect/dismantle complex scaffolding and equipment
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Plan and coordinate erection of scaffold/equipment	1.1. Site plans, scaffolding/equipment designs and drawings to industry practices are interpreted as necessary. 1.2. Work area is inspected to identify hazards and appropriate prevention/control measures are implemented to avoid hazard. 1.3. All work is undertaken safely and to prescribed procedures. 1.4. Erection site is prepared to meet job and safety

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ELEMENT	PERFORMANCE CRITERIA
	requirements. 1.5. Necessary signage and barriers are placed in appropriate position. 1.6. Scaffolding/equipment erection is coordinated in accordance with acceptable safe work practices, Australian standards, State or Territory legislative requirements and equipment manufacturers' requirements. 1.7. Completed scaffolding/equipment is inspected for safety and compliance with design, operational and statutory requirements.
2. Coordinate alterations and repairs of scaffold/equipment	2.1. Scope of alteration/repair is confirmed and understood. 2.2. Existing scaffolding/equipment is inspected and alterations/repairs determined. 2.3. Materials, equipment and tools required for alterations are determined. 2.4. Existing or new load requirements are determined using load tables. 2.5. Alteration/repairs are coordinated in accordance with safety work practices, Australian standards and equipment manufacturers' requirements. 2.6. Alterations/repairs are inspected for safety and operational requirements. 2.7. Work completion is reported to appropriate personnel and recorded.
3. Inspect completed scaffold/equipment	3.1. The critical structural and safety areas of the scaffolding/equipment are inspected for damage, corrosion and wear. 3.2. Scaffolding/equipment and structure is checked against the type of scaffolding/equipment and structure specified in the plan. 3.3. Inspection log is completed. 3.4. Potential safety and design/structural hazards are reported for rectification.
4. Coordinate dismantling of scaffold/equipment	4.1. Work is coordinated safely and to standard operating procedure. 4.2. Scaffolding/equipment is removed from site in accordance with standard operating procedures and critical structural and safety requirements. 4.3. Site clearance is coordinated, and surplus material, equipment, tools and debris are removed and site left

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ELEMENT	PERFORMANCE CRITERIA
	in safe and operational state. 4.4. Work completion is reported to appropriate authority.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • levelling and alignment of scaffolding • interpreting instructions and legislative requirements • using basic hand tools • assessing risk • using manual handling techniques • cleaning up and site remediation • time management • determining personnel and equipment requirements • inspecting completed scaffolding with reference to structural integrity and design faults • locating, reading and interpreting information on written job instructions, specifications, drawings, charts, lists and other reference documentation • planning, sequencing operations • checking and clarifying strategies • working safely and confidently at heights
Required knowledge
Look for evidence that confirms knowledge of: • erection and dismantling procedures as set in the Australian standards • codes of practice, for example the Scaffolder's Guide • site specific requirements • safety procedures • types of scaffolding systems • deck loadings • hazards; electrical, stability, mobile plant issues/requirements; falls protection measures; minimum gap requirements; safe access and egress

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REQUIRED SKILLS AND KNOWLEDGE
• sequence of operations in erecting and dismantling the scaffolding • design and materials faults such as rust, wear and tear, stress • use and application of personal protective equipment • safe work practices and procedures • scaffolding techniques and equipment • limitations of equipment • materials handling, storage and environmentally friendly waste management

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to coordinate the erection, repair, maintenance and dismantling of all scaffolding applications. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with coordination of the erection, repair, maintenance

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EVIDENCE GUIDE	
	and dismantling of all scaffolding applications or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifi-cations, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Scaffolding/equipment	• Tube and fitting scaffolds as limited by legislative requirements • Fall protection devices • Catch platforms • Standing prefabricated tower scaffolds and bracket scaffolds • Mobile scaffolds • Cantilevered hoists • Cantilevered and spurred scaffolds • Platforms and course-ways • Suspended scaffolds

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RANGE STATEMENT	
	• Cantilevered cranes • Loading platforms • Hung scaffolds Complex scaffolding means Intermediate Scaffolding and above as set out the legislative requirements in each State and Territory. The major difference between the complex and basic scaffolding is the height of the working platform and certain types of scaffolding and configurations
Hazards	• Chemicals, dangerous or hazardous substances/materials • Movement of equipment, goods, materials, vehicular traffic • Uneven/unstable terrain, overhead service lines, trees, underground services, obstructions, structures, surrounding buildings, facilities, bridges/walkways, lifting equipment
Prescribed procedures	• Clarification of instructions either written or from authorised personnel • Site safety policy and procedures • Standard operating procedures • Correct use of equipment • Industry standards and requirements • Manufacturers' specifications
Signage and barriers	• Physical barriers (parawebbing, bollards, timber or metal barriers) • Warning/direction signs • Personnel to restrict unauthorised access (spotters) • Permit signage
Safe work practices	Hazard identification, control measures, risk assessment, standard operating procedures, house keeping and personal protective equipment
State or Territory legislative requirements	• Appropriate OH&S and Scaffolding acts and regulations • Australian standards and codes of practice and • NOHSC:1006

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Materials handling

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MEM11004B Undertake dogging

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers attaching slings to loads and moving loads using appropriate communication and signalling methods.

Application of the Unit

Application of the unit	This unit applies to the skills used when working with loads, selecting equipment and communicating with a crane driver in a workshop or on site. The scope of work is to demonstrate competence in the application of slinging techniques, selection and inspection of lifting gear, and direction of the crane/hoist operator in the movement of the load including when the load is out of view of the operator. This unit is not intended to apply to machine loading and simple straight lifts where knowledge of codes and signals is not required. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units		
Path 1	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Attach lifting gear to loads	1.1. Potential hazards associated with the use of cranes and other load shifting equipment are identified and measures to eliminate or control these hazards are planned. 1.2. Site information is obtained as necessary. 1.3. All work is undertaken safely and to prescribed procedures. 1.4. Load is inspected and best lifting method determined. 1.5. Load shifting equipment is selected appropriate to load. 1.6. Lifting gear is inspected and damaged or worn items are labelled and rejected. 1.7. Where appropriate, safe working loads are calculated

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ELEMENT	PERFORMANCE CRITERIA
	to Australian standards. 1.8. Lifting gear is attached to load in most appropriate and safe manner and to specifications where required.
2. Move loads	2.1. Load moving is performed to acceptable safe working practices, Australian standards, codes of practice and specifications. 2.2. Lifting gear is connected to load shifting equipment using safe and appropriate techniques. 2.3. Communication and signalling methods are used as appropriate to coordinate the load movement in a safe manner. 2.4. Load is grounded or put down in accordance with prescribed procedure, in a safe and stable manner. 2.5. All lifting gear is detached from load mover and load.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- selecting lifting methods and load shifting equipment appropriate to the task
- attaching loads
- calculating safe working loads
- communicating with related personnel about the lift
- using of basic hand tools relating to lifts
- identifying hazards and assessing risk
- identifying damaged/worn lifting gear
- self management
- team work
- problem solving

Required knowledge

Look for evidence that confirms knowledge of:

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REQUIRED SKILLS AND KNOWLEDGE
• Australian standards, codes of practice and specifications • lifting methods and lifting gear to suit various loads • dogging signals and communication methods • calculations relevant to lifting procedures • lifting methods • types and applications of load shifting equipment • hazards and control measures associated with dogging • use and application of personal protective equipment • safe work practices and procedures • licensing requirements • permit requirements • site/non-site personnel • manufacturers' specifications • enterprise procedures • workplace communication procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to calculate, sling, and arrange safe movement of a load. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic

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EVIDENCE GUIDE	
	workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the calculation and safe movement of loads or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Hazards	May include overhead power lines, trees, overhead service lines (such as steam, gas, water, telephone), underground services, uneven and/or unstable ground, allowable floor loading as

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RANGE STATEMENT	
	appropriate, other workers and persons, surrounding buildings/vessels/structures equipment, hazardous materials, corrosive substances, barricades, inadequate lighting and radio interference
Load shifting equipment	May include overhead cranes, overhead gantry, forklift with approved lifting boom/jib, mobile cranes
Lifting method	Slings in an appropriate configuration
Lifting gear	Tags, slings, ropes, shackles, lifting clutches, snatch blocks, I bolts, spreader beams, chain blocks, chain shorteners and may include equalising sheaves, collared I bolts, turn buckles, rigging screws and lifting lugs
Calculations	Load and gear calculations
Safe working practices	• Inspection of the environment • Assessment of hazards • Personnel safety
Communication and signalling methods	• Signals are given both within sight and out of sight of equipment operators. • Signals include stop, raise, lower, slew, luff, extend and retract boom, using hands, verbal instructions and whistles
State or Territory legislative requirements	• Appropriate OH&S and acts and regulations • Australian standards and codes of practice and • NOHSC:1006 • AS1418

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Materials handling

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MEM11005B Pick and process order

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers receiving an order, picking an order, checking against documentation, placing in the correct area and completing enterprise documentation.

Application of the Unit

Application of the unit	This unit applies where the employee needs to exercise knowledge of the enterprise product range and the procedures, practices and standards for the storage and handling of a product. If materials handling equipment skills are needed, Unit MEM11010B (Operate mobile load shifting equipment) should be accessed. Simple handling of goods not requiring the ability to identify different products or to interact with inventory records and stock location systems is covered by Unit MEM11010B (Operate mobile load shifting equipment) or Unit MEM11011B (Undertake manual handling). **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Receive order	1.1. Orders are received and checked for errors. 1.2. Product to be picked is identified.
2. Pick order	2.1. Materials handling equipment appropriate to products is selected and used, if required. 2.2. Products to be picked are located using standard operating procedures. 2.3. Order is picked accurately, either by manual handling or using materials handling equipment. 2.4. Product is handled according to storage and handling requirements identified in standard operating procedures/regulations.

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ELEMENT	PERFORMANCE CRITERIA
3. Finalise order picking	3.1. Picked order is checked against documentation. 3.2. Picked order is placed in correct area for consolidation. 3.3. Enterprise documentation is completed.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading and interpreting routine information on written orders and standard operating procedures. May include simple drawings
- using materials handling equipment in a warehouse
- identifying dangerous goods
- following oral instruction
- entering routine and familiar information onto proformas and standard workplace forms

Required knowledge

Look for evidence that confirms knowledge of:

- safe manual handling procedures
- reasons for selecting materials handling equipment
- safe storage and handling procedures for a range of products including dangerous goods
- applicable Material Safety Data Sheets
- applicable industry standards, national/Australian standards, NOHSC guidelines, State/Territory regulatory codes of practice/standards
- use and application of personal protective equipment
- safe work practices and procedures
- hazards and control measures associated with picking and processing orders

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to pick and process orders and store products according to enterprise procedures.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with picking and processing orders or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for	

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EVIDENCE GUIDE	
assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Materials handling equipment	Forklift, order picker, WAVE truck, pallet trucks, wheelbarrow, trolleys, sack truck
Storage and handling requirements	As per legislative requirements e.g. dangerous goods and storage of poisons acts and regulations
Enterprise documentation	Invoices, orders, returns, recording cards, inventory documentation, maintenance inventories, etc. and may include documents (hardcopy or electronic) required by legislation

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Materials handling

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MEM11006B Perform production packaging

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers packaging and labelling of finished goods for storage or transport.

Application of the Unit

Application of the unit	This unit typically applies in a production/process environment. It would normally involve packing of finished goods, including assemblies, sub-assemblies, individual or multiple components. This unit is not intended to apply in situations where simple interim packing, storage and/or stacking are undertaken in context of a production function. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Undertake packaging	1.1. Packaging requirements are identified from instructions or determined by safety, storage conditions, site and legislative requirements. 1.2. Packaging is undertaken to standard operating procedures.
2. Label packaged items	2.1. Identification labels, tags and stickers are checked for correctness and appropriately placed/attached. 2.2. Packaged items are stored in a safe, orderly and retrievable manner and the location in the warehouse/store is recorded.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE
Look for evidence that confirms skills in: • reading and interpreting routine information on written job instructions and standard operating procedures. May include simple drawings • determining packaging requirements from safety, storage conditions, site and legislative requirements • labelling packaged items • handling and storing products • using scanning devices, if required • following oral instruction • entering routine and familiar information on to proforma and standard workplace forms • orally reporting routine information
Required knowledge
Look for evidence that confirms knowledge of: • labelling procedures and standards • storage and recording procedures • use and application of personal protective equipment • safe work practices and procedures • hazards and control measures associated with production packaging

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to undertake production packaging and labelling of items.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

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EVIDENCE GUIDE	
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with production packaging or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Packaging requirements	• Packaging methods include manual processes, semi automatic and fully automated packaging equipment • Procedures undertaken include standards, codes, legislative, company and customer requirements • Packaging material is generally determined from instructions, written or verbal
Storage conditions, site and legislative requirements	As per legislative requirements e.g. dangerous goods and storage of poisons acts and regulations

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Materials handling

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MEM11007B Administer inventory procedures

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers using inventory procedures and requisitioning goods.

Application of the Unit

Application of the unit	The unit applies to the administration of inventory procedures using manual or electric systems to support or maintain stores or inventory systems, for example Just-in-Time or KANBAN systems. Where routine activity within standard operating procedure is undertaken, refer to Unit MEM16006A (Organise and communicate information) or Unit MEM16008A (Interact with computing technology). **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Use inventory procedures	1.1. Inventory procedures are applied to standard operational procedures. 1.2. Requisition, purchase, shipping and invoice documentation is used as required to standard operational procedures. 1.3. Inward/outward recording/filing system is accessed and maintained to standard operational procedures. 1.4. Customer orders are maintained to standard operational procedures. 1.5. Returned orders are booked back using standard operational procedures.
2. Requisition goods	2.1. Requisition procedures are applied to standard operational procedures. 2.2. Goods are requisitioned on time. 2.3. All recording is completed and filed correctly in accordance with site procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading, interpreting and following information on requisition, purchase, shipping and invoice documentation, standard operating procedures, charts, lists and other applicable reference documents • accessing and maintaining manual and electronic inventory information • undertaking numerical operations and calculations within the scope of this unit • organising information • recording and filing information • managing time • checking for conformance to specifications • measuring to specified tolerances • entering information on to manual and electronic proformas and standard workplace documents
Required knowledge
Look for evidence that confirms knowledge of: • features and application of inventory systems such as Just-in-Time, KANBAN • inventory procedures • safe work practices and procedures • use and application of personal protective equipment • hazards and control measures associated with administering inventory procedures • measurement techniques, tools and equipment for administering inventory procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must

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EVIDENCE GUIDE	
	be able to administer inventory procedures.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with inventory procedures or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Inventory procedures	Inventory systems such as Just-in-Time or KANBAN systems

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Materials handling

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MEM11010B Operate mobile load shifting equipment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers operating mobile load shifting equipment, including moving and placing loads.

Application of the Unit

Application of the unit	This unit applies to the general operation of mobile load shifting equipment, including planning the work, moving and placing loads, and shutting down and securing equipment after operation where knowledge of codes and signals is not required. The unit applies to moving loads in workshops and/or on site. This may include but is not limited to factories, wharfs, ships, warehouses, manufacturing plants, building sites, road construction, demolition sites, quarries and mine sites. If hand tools are required, Unit MEM08001B (Use hand tools) should also be selected. Awareness of licensing requirements - licenses may be required for mobile load shifting equipment in some jurisdictions. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Refer to Application of the Unit

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare to shift loads	1.1. Work area is inspected to identify hazards, and appropriate prevention/control measures are implemented to avoid hazards. 1.2. Routine pre-operational checks are undertaken in accordance with manufacturers' specifications and regulatory safety requirements. 1.3. Attachments and/or equipment are inspected.
2. Check controls and equipment	2.1. Pre-operational and post start-up equipment checks are carried out in accordance with manufacturers' specifications and/or operating manual. 2.2. Defects and damage are reported according to site procedures.

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ELEMENT	PERFORMANCE CRITERIA
3. Shift loads	3.1. The most appropriate load shifting device is selected to suit load and shifting requirements. 3.2. Load shifting device is operated within design specifications and safe working load in accordance with standard operating procedures. 3.3. Load is lifted, ensuring balance, vision of operation and protection of load. 3.4. The safe and efficient path of movement is selected and used. 3.5. Path of movement is checked and monitored for obstacles and hazards and safely are maintained.
4. Place loads	4.1. Loads are placed ensuring safety, stability, protection of material and avoidance of hazards on site.
5. Shut down equipment and secure site	5.1. Machinery is parked avoiding equipment hazards. 5.2. Shut-down is conducted in accordance with manufacturers' specification to isolate vehicles. 5.3. Post-operational check is completed in accordance with operational procedures. 5.4. Machinery is parked in accordance with standard operating procedures, avoiding site hazards.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • interpreting and following routine information on standard operating procedures. May include simple drawings, tables and figures, written documents • performing routine safety, basic service and maintenance procedures • calculating load masses and safe working loads • selecting appropriate load shifting device • following oral instructions • safely operating load shifting devices and shifting loads • working with others • interpreting communication signals and instructions

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REQUIRED SKILLS AND KNOWLEDGE
• determining load masses and equipment requirements • determining mass of irregular shaped loads • demonstrating emergency operating procedures • communicating faults, malfunctions and workplace hazards, reports and maintenance of operational records
Required knowledge
Look for evidence that confirms knowledge of: • pre-operational checks • design specifications of load shifting device • load chart • licensing requirements • load protection • safe load placement • operational environment • appropriate permits • hazards and control measures associated with load shifting and equipment • use and application of personal protective equipment • safe work practices and procedures • workplace communication procedures • manufacturers' specifications

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to operate load sifting equipment to move and place loads.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

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EVIDENCE GUIDE	
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using load sifting equipment to move and place loads or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and

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RANGE STATEMENT	
regional contexts) may also be included.	
Pre-operational checks	Battery, water, fuel, hazards warning lights, fluid or gas leaks, braking, movement of booms, visual checks of tyres, emergency devise/alarms, log books, operating motions, evidence of damage, excessive wear and tear, as determined by manufacturers' specifications and standard operating procedures
Attachments and/or equipment	Hooks, electromagnetic hook, buckets, slings, tag lines, buckets, trench, excavating, rock breakers, shackles, lifting lugs, fork arms
Post start-up	• Hazards warning systems, attachments, movements and control functions are smooth • Operating and emergency controls and safety devices are located, identified and tested • Communication signals are confirmed • Defects and damage are reported
Load shifting device	Front end loaders/back hoes, ride on forklifts and pallet trucks, bobcats, vehicle loading crane
Safe working load	Weight of load is assessed to ensure compliance with equipment load plate specifications
Standard operating procedures	Industry standards, production schedules, material safety data sheets, work notes and plans, product labels, manufacturers' specifications, operator manuals, enterprise policies and procedures, supervisors' oral and written instructions, current State/Territory occupational health and safety legislation, standards and codes of practice
Obstacles and hazards	• Overhead cables, personnel, obstacles (fixed and moveable), trenches, pits, uneven terrain, trees, underground services • Exposure to chemicals, dangerous or hazardous substances • Movements of equipment, goods, materials and vehicular traffic
Shut-down	• Post-operational equipment checks, motion locks and brakes are applied • Lifting equipment is checked • Defective equipment is identified, segregated

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RANGE STATEMENT	
	and reported to supervisor • Equipment is correctly stowed

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Materials handling

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MEM11011B Undertake manual handling

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers lifting and moving materials manually.

Application of the Unit

Application of the unit	This unit applies to lifting and moving materials manually and/or using basic manual handling equipment in a wide range of environments. Maximum manual lifting weight is limited to National Occupational Health and Safety Commission (NOHSC) recommendations. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Lift materials manually	1.1. Material weight is determined correctly utilising most appropriate technique, and risks associated with lifting are assessed. 1.2. Lifting techniques are undertaken to National Occupational Health and Safety Commission (NOHSC) and standard operating procedures. Types of movement, methods, storage, height and position are considered.
2. Move/shift materials manually	2.1. Appropriate equipment is selected where required. 2.2. Material is placed safely and securely on moving equipment. 2.3. Material is relocated ensuring safety of personnel and security of material. 2.4. Material is unloaded from moving equipment and placed in a safe and secure manner.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • identifying relevant standards and lifting techniques • assessing weight of material • selecting lifting equipment • working and communicating in teams • assessing risks • planning • reading and interpreting routine information on written job instructions, specifications and standard operating procedures. May include drawings • following oral instructions
Required knowledge
Look for evidence that confirms knowledge of: • manual handling techniques • hazards of incorrect procedures • NOHSC standards for manual handling • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to move loads manually using appropriate aids.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

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EVIDENCE GUIDE	
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with moving loads manually or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Material weight	Material weight is determined using scales or interpreting signage
Lifting techniques	Individual or team lifting, use of appropriate lifting equipment
Appropriate equipment	Hand trolleys, wheelbarrows, motorised/hand pallet trucks (not sit on), scissor lifts, boom lifts, hand carts, dedicated production or process lifting equipment such as baskets, spreader bars, cradles or the like attached to lifting equipment

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Materials handling

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MEM11012B Purchase materials

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers determining purchasing requirements, preparing purchase order/list and purchasing materials.

Application of the Unit

Application of the unit	This unit applies to purchasing one-off or multiple quantities of raw materials, components, equipment etc. Contracts and paperwork may be generated manually or electronically using the on-site system. **Band**: **A** **Unit Weight**: **6**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine purchasing requirements	1.1. Client, customer, user is consulted as necessary to determine purchasing requirements. 1.2. Material specifications are determined from orders, instructions and/or technical drawings. 1.3. Quantities, price limitations and delivery requirements are determined from orders, instructions.
2. Prepare purchase order/list	2.1. Purchase order/list is developed to standard operational procedure.
3. Purchase material	3.1. Standard operating procedures are followed. 3.2. Supplier/vendor is informed of requirements and specifications. 3.3. Purchasing schedules are adjusted where required to standard operating procedures. 3.4. Appropriate paperwork/contracts are exchanged to standard operating procedures. 3.5. Records/files are maintained accurately using standard operating procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading, interpreting and following information on orders, instructions and/or technical drawings, standard operating procedures, purchasing schedules, orders, records, files and other applicable reference documents • planning and sequencing tasks • checking and clarifying information • entering and maintaining information on manual and electronic workplace documents • checking for conformance to specifications • communicating with client, customer, user, supplier/vendor • identifying purchasing specifications • calculating quantity, price and delivery requirements • selecting suppliers • maintaining purchase documentation
Required knowledge
Look for evidence that confirms knowledge of: • suppliers and available products • purchasing procedures • contract initiation and exchange procedures • safe work practices and procedures • hazards and control measures associated with purchasing materials

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare a purchase order and purchase

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EVIDENCE GUIDE	
	materials.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with preparing a purchase order and purchasing materials or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Purchasing	Can cover one-off or multiple quantities of raw materials, components, equipment etc.
Purchasing schedules	• Purchasing specifications - determined from standard engineering drawings and data sheets, instructions written or verbal • Purchasing schedules - developed to site procedures and for pre-contracted suppliers/vendors
Paperwork/contracts	Generated manually or electronically utilising on-site system

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Materials handling

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MEM11016B Order materials

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing a purchase/order list and placing the order.

Application of the Unit

Application of the unit	This unit applies to purchasing activities carried out by a person other than the purchasing officer, such as maintenance, service, stores and warehouse personnel. Approval to order limits and delegations will be included in the standard operating procedures or purchasing policy **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare purchase order/list	1.1. Purchase order/list is prepared to standard operating procedures. 1.2. Material specifications, price limitations, quantities and delivery requirements are determined from instructions, requisitions etc.
2. Purchase order	2.1. Supplier/vendor is informed of requirements and specifications according to standard operating procedures. 2.2. Supplier/vendor is followed up to achieve delivery as required. 2.3. Where appropriate, goods are directly received and checked for damage. 2.4. Records/files are completed accurately according to standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE
Required skills
Look for evidence that confirms skills in: • reading, interpreting and following information on instructions, specifications, standard operating procedures, requisitions, lists, records, files and other applicable reference documents • preparing an order/list • checking and clarifying order information • entering information onto manual and electronic proformas and standard workplace forms • accessing manual and electronic order information • communicating with suppliers, manufacturers and other personnel • checking for conformance to specifications • following verbal instructions • orally reporting routine information • record keeping
Required knowledge
Look for evidence that confirms knowledge of: • ordering policy (delegations, preferred suppliers etc.) • ordering procedures • safe work practices and procedures • hazards and control measures associated with ordering materials

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to order materials.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency

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EVIDENCE GUIDE	
	in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with ordering materials or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and

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RANGE STATEMENT	
regional contexts) may also be included.	
Material specifications	Material specifications can be gained from manufacturers' catalogues, from the item, from a drawing
Supplier/vendor	Local, national, international, preferred supplier

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Materials handling

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MEM11017B Organise and lead stocktakes

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers planning a stocktake, briefing the participants, generating stocktake reports and adjusting inventory documentation.

Application of the Unit

Application of the unit	This unit applies to organising and leading periodical stocktakes in accordance with enterprise stocktaking policies, practices and procedures. It involves briefing the stocktake participants and reporting on the result. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM11007B	Administer inventory procedures

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan stocktake	1.1. Inventory lists are prepared and distributed. 1.2. Warehouse and/or production areas are allocated to each individual or team assisting in stocktake.
2. Brief participants in stocktake	2.1. Clear directions and appropriate documentation and equipment are provided to each individual or team participating in stocktake.
3. Generate stocktake reports	3.1. Written or computer reports are collected from individuals or teams on stock counts. 3.2. Inventory data is confirmed to match stock levels. 3.3. Stock discrepancy report is prepared and distributed according to standard operating procedure.
4. Adjust inventory documentation	4.1. Inventory documentation is reconciled to match physical stock in accordance with regulatory and operating procedures. 4.2. Stocktake information is reconciled with audit requirements.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • preparing inventory lists and instructions on procedures to be followed • entering inventory information onto manual and electronic proformas and standard workplace forms • analysing and reporting results of stocktakes by manual and electronic means • performing calculations related to reconciling stocktake records • using communication skills to effectively instruct/direct stocktake participants
Required knowledge
Look for evidence that confirms knowledge of: • relevant inventory systems and procedures • recording systems and procedures • analysis and reporting methods/procedures • audit processes • safe work practices and procedures • hazards and control measures associated with organising and leading stocktakes

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to organise and lead a stocktake. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency

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EVIDENCE GUIDE	
	in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with organising and leading a stocktake or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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RANGE STATEMENT	
situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Directions	Oral or written instructions, methodology, how to report discrepancies or damaged stock, timelines
Equipment	Calculators, scanners and portable computers
Inventory documentation	Reports on actual stock, damaged stock, out of date stock and discrepancies

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Materials handling

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MEM11021B Perform advanced operation of load shifting equipment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers determining lifting and loading requirements, working within areas of restricted movement or conditions of restricted visibility, identifying loads that need special care, and operating forklifts in special traffic conditions.

Application of the Unit

Application of the unit	This unit applies to advanced forklift and load shifting skills above those required for general operation. To be credited with this unit it is expected that an employee would be competent in situations indicated by all elements and performance criteria. This unit is intended to cover load shifting applications where special-purpose equipment/accessories requiring advanced operational skills are required. This would include heavy, out of balance, awkward and irregular shaped loads traversing over rough, broken or uneven surfaces, high lift situations, extremes of climate. Awareness of licensing requirements: Licenses may be required for load shifting equipment in some jurisdictions **Band**: **A** **Unit Weight**: **2**

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Licensing/Regulatory Information

Refer to Application of the Unit

Pre-Requisites

Prerequisite units		
Path 1	MEM11010B	Operate mobile load shifting equipment

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine lifting and loading requirements	1.1. Load is identified and checked against safe working load and final position/location and/or relevant specifications or regulations. 1.2. Special handling requirements of load are identified, if applicable. 1.3. Load is lifted correctly and placed in final position/location to achieve specified balance of

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ELEMENT	PERFORMANCE CRITERIA
	load.
2. Work in areas of restricted movement or conditions of restricted visibility	2.1. Load is collected and manoeuvred without damage to load or collision with obstacles according to standard operating procedures.
3. Identify and carry loads that require special care	3.1. Loads requiring special care are identified. 3.2. Loads are carried in accordance with special requirements of product according to standard operating procedures and/or regulations.
4. Operate forklifts in special traffic conditions	4.1. Forklifts are operated in areas of heavy traffic. 4.2. Forklifts are operated over difficult or uneven surfaces. 4.3. Forklifts are operated in areas shared with the general public, as required.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading/interpreting specifications, regulations, load charts and standard operating procedures, including simple drawings
- selecting appropriate load shifting device
- identifying safe working loads
- identifying/managing special conditions and equipment
- operating in a complex mobile plant environment
- communicating with personnel on movement/location
- following oral instructions

Required knowledge

Look for evidence that confirms knowledge of:

- pre-operational checks
- licensing requirements and appropriate permits
- load protection

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REQUIRED SKILLS AND KNOWLEDGE
• operational environment • methods and techniques for loads requiring special care • hazards and control measures associated with this unit • use and application of personal protective equipment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to operate load shifting equipment in special conditions. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with operating load shifting equipment in special conditions or other units requiring the exercise of the skills and knowledge covered by this unit.

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EVIDENCE GUIDE	
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Safe working load	As defined in the manufacturers' specifications for lifting plant or gear
Loads requiring special care	• Non-standard load configuration • Fragile loads • Dangerous (volatile, explosive, sensitive) • Raising and lowering personnel on approved work platforms (forklift only)

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Materials handling

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MEM11022B Operate fixed/moveable load shifting equipment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers conducting routine operation and safety checks of fixed/moveable load shifting equipment, picking up loads, shifting and placing loads.

Application of the Unit

Application of the unit	This unit applies to the operation of fixed/moveable load shifting equipment within the limits of manufacturers' recommended procedures and safe working loads. It applies to load shifting/lifting activities where knowledge of codes and signals is not required. When using dedicated lifting equipment or devices where decisions regarding loads and methods of attachment are not required, Unit MEM11011B (Undertake manual handling) should be selected. Awareness of licensing requirements - licenses may be required for fixed/moveable load shifting equipment in some jurisdictions. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Refer to Application of the Unit

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Conduct routine operation and safety checks of load shifting equipment	1.1. Operational principles of fixed/moveable load shifting equipment are understood. 1.2. Routine pre-operational checks are undertaken in accordance with manufacturers' specifications and regulatory safety requirements. 1.3. Non-compliance with specifications is reported using standard operating procedures.
2. Pick up loads	2.1. Appropriate load shifting device is selected for the load and shifting requirements. 2.2. Load shifting device is operated within design specifications and safe working load. 2.3. Load is lifted/rolled, ensuring balance, vision of

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ELEMENT	PERFORMANCE CRITERIA
	operation, safety of personnel and protection of load.
3. Shift loads	3.1. Where required, load is moved at an appropriate and safe speed using a safe and efficient path. 3.2. Path of movement is monitored for obstacles and hazards during shifting process.
4. Place loads	4.1. Loads are lowered at an appropriate and safe rate. 4.2. Loads are placed to ensure stability, protection of material and avoidance of hazards on site.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading and interpreting routine information on instructions, specifications, load charts and standard operating procedures. May include simple drawings
- selecting and operating appropriate load shifting device
- communicating with others about movement of equipment
- checking and clarifying task-related information
- identifying the safe working load in relation to the capacity of the crane and lifting gear
- following oral instruction
- safely lifting, moving and placing loads

Required knowledge

Look for evidence that confirms knowledge of:

- operational principles of fixed/moveable load shifting equipment
- pre-operational checks
- loads and lifting attachments
- load chart and safe working loads (SWL)
- awareness of licensing requirements
- load protection
- operational environment
- appropriate permits

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REQUIRED SKILLS AND KNOWLEDGE
• use and application of personal protective equipment • safe work practices and procedures • hazards and control measures associated with operating fixed/moveable load shifting equipment

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to operate fixed/moveable load shifting equipment to move and place loads.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with operating fixed/moveable load shifting equipment or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct

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EVIDENCE GUIDE	
	observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Fixed/moveable load shifting equipment	• Pendant cranes • Yard, workshop and travelling overhead cranes • Monorail hoists and chain blocks • Pivoting and slewing jibs rails (manual, air or electric etc.)
Pre-operational checks	Hazards warning lights, wire rope, lifting blocks, compass, operation of controls, safe working load marked as determined by manufacturers' specifications and standard operating procedures
Obstacles and hazards	Overhead cables, electrical hazards (live rails), personnel, obstacles (fixed and moveable), swing of the load and failure of slings

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Materials handling

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MEM12001B Use comparison and basic measuring devices

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers sorting items using basic comparison measuring equipment, and maintaining the equipment.

Application of the Unit

Application of the unit	Measurements are conducted in a production environment or at a work station. Work is undertaken autonomously or as part of teamwork. All comparative measurements are undertaken to standard operating procedures and to regulatory and legislative requirements. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Use comparison and/or basic measuring devices	1.1. Measuring devices are identified and used to undertake required comparisons or measurements using standard operating procedures. 1.2. Checking or sorting of items is undertaken using comparison and/or basic measuring device according to standard operating procedures.
2. Maintain comparison and/or basic measuring devices	2.1. Basic care and storage is maintained to manufacturers' standards or standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE
Look for evidence that confirms skills in: • using device in accordance with standard operating procedures • storing and maintaining devices • using basic numeracy skills for undertaking comparison measurements • following oral instructions and written standard operating procedures
Required knowledge
Look for evidence that confirms knowledge of: • use and application of various comparison or measurement devices • procedures for the correct use of devices • procedures for maintaining and storing devices • hazards and control measures associated with conducting measurements, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to use comparison and basic measuring devices.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment

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EVIDENCE GUIDE	
	should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using comparison and basic measuring devices or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Basic measuring devices	Linear measuring devices measuring to within 1mm graduation - may include rules, tapes and retractable tapes
Comparisons	Comparison of length, angle, size, temperature, pressure, weight, voltage, resistance and amperage

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RANGE STATEMENT	
Comparison measuring devices	Go/no-go devices, thread angle and taper gauges, temperature gauges, pressure gauges, measuring gauges and overlay indicators, templates, digital devices and pre-set verniers and micrometers

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Measurement

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MEM12002B Perform electrical/electronic measurement

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers selecting and using basic electro-measuring devices to check variables and the ability to maintain the devices.

Application of the Unit

Application of the unit	This unit applies to the measurement of voltage, current, resistance, power, frequency etc. on a.c. and d.c. circuits up to 1000 volts, using appropriate measuring devices and for a range of general applications. Measurement skills for specific applications and context are covered by other units. For simple measurement tasks such as reading of fixed devices, testing continuity, and tasks requiring the use of devices mounted in measuring jigs etc. Unit MEM12023A (Perform engineering measurements) and/or Unit MEM12001B (Use comparison and basic measuring devices) should be considered. If electrical/electronic measuring devices require the connection or disconnection of circuitry, the appropriate units should also be selected. In circumstances where the application of this unit or where legislation dictates, relevant units covering first aid and/or emergency procedures should also be considered. **Band**: **A** **Unit Weight**: **2**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Use electro-measuring devices to measure variables	1.1. Appropriate device or equipment and setting is selected to obtain required measurement. 1.2. Appropriate connections are made to obtain required measurement according to standard operating procedure. 1.3. Readings are obtained and interpreted correctly and conversion is made where necessary into the required units of measurement.

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ELEMENT	PERFORMANCE CRITERIA
2. Maintain electro devices	2.1. Routine care and storage of devices is undertaken to manufacturer's specifications or standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- setting and using electro-measuring devices
- obtaining and interpreting specified electrical measurements
- selecting appropriate measuring devices
- performing arithmetic operations required to convert measurements into appropriate units of measurement
- maintaining and storing electro-measuring devices
- reading and interpreting information on standard operating procedures

Required knowledge

Look for evidence that confirms knowledge of:

- terminology and concepts relating to electrical/electronic measurement
- the selection of different measuring devices for particular applications within the scope of this unit
- specifications of selected electro-measuring devices
- the application of the settings on each electro-measuring device
- the procedures for obtaining electrical/electronic measurements
- procedures for connecting electro-measuring devices to circuitry
- the correct scale for each setting on the electro-measuring device
- the scale factor to be applied to readings taken from the electro-measuring device
- the units applying to electrical and electronic measurements
- maintenance and storage requirements for a range of electro-measuring devices
- that devices can impact on the circuit condition
- relevant State/Territory or Commonwealth legislative and regulatory requirements, industry standards, NOHSC guidelines and code of practice
- hazards and control measures associated with electrical/electronic measurement
- safe work practices and procedures

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REQUIRED SKILLS AND KNOWLEDGE
• use and application of personal protective equipment

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform electrical/electronic measurement.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with electrical/electronic measurement or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate

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EVIDENCE GUIDE	
	must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Appropriate device or equipment	Analogue/digital multi meters, clip-on meter, oscilloscopes, potentiometers determined according to the type of measurement being taken
Routine care	Zero and linear adjustments, inspection, check for serviceability and safe operation

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units	

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Co-requisite units		

Competency field

Competency field	Measurement

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MEM12003B Perform precision mechanical measurement

Modification History

Editorial correction to unit application to include missing notes relating to dual band status.

Single band identifier removed to clarify dual status.

Unit Descriptor

Unit descriptor	This unit covers performing precision mechanical measurement by using precision measuring equipment, setting comparison measuring devices and maintaining precision equipment.

Application of the Unit

Application of the unit	The unit applies to precision and/or complex use of strip gauges, engineering squares, lasers, angle dekkors, sine bars, angle gauges, polygons, dividing heads, rotary tables, precision levels, micrometers, height gauges, hardness testers, and texture measuring equipment etc. Work is undertaken autonomously or as part of team environment. Work is undertaken in the field (in situ) or in a workshop/laboratory environment. This unit covers comprehensive measuring skills where judgement is required in the selection of the most appropriate techniques/devices and where results are interpreted/analysed. All specifications are obtained from engineering drawings and data sheets and/or manufacturers' instructions/data. All measurement/test procedures are undertaken to standard operating procedures or manufacturers' recommended procedures. **Band**: This unit has dual status and is to be regarded as both a Specialisation Band A unit and Specialisation Band B unit for progression to C7 (AQF level IV)

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	Unit Weight: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM12023A	Perform engineering measurements

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Use precision measurement equipment	1.1. Appropriate precision equipment is selected to achieve specified outcome. 1.2. Correct and appropriate measuring techniques are

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ELEMENT	PERFORMANCE CRITERIA
	used for the measurement task. 1.3. Measurements are taken accurately to the finest graduation of instrument. 1.4. Readings and measurements are interpreted correctly and accurately.
2. Set comparative measuring devices	2.1. Measuring equipment is set to specifications using manufacturer guidelines or standard operating procedures and techniques.
3. Maintain precision equipment	3.1. Measuring equipment is adjusted and maintained to required accuracy, using manufacturer or standard operating procedures and techniques. 3.2. Equipment is stored to manufacturer specifications or standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading and interpreting text and numerical information on manufacturer specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • selecting/using precision mechanical measuring devices • setting measuring devices to specification • obtaining specified mechanical measurements to the finest graduation of the device • measuring components to specified tolerances • reading and interpreting measurements • maintaining and adjusting precision mechanical measuring devices • storing precision mechanical measuring devices • undertaking calculations and numerical operations for measurement using precision mechanical measuring equipment
Required knowledge
Look for evidence that confirms knowledge of: • the appropriate precision mechanical measuring device for given measurement

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REQUIRED SKILLS AND KNOWLEDGE
requirements • procedures to verify equipment being used has been recently calibrated • suitability of environmental conditions for the measurements being carried out • procedures/techniques for obtaining a range of mechanical measurements • the accuracy to which a range of precision mechanical measuring devices can be read • procedures for reading graduated mechanical measuring devices • units of measurement and numerical operations within the scope of this unit • procedures for setting precision mechanical measuring devices • specifications of the equipment to be set • tools and equipment for setting mechanical measuring devices • the adjustments that can be made to a range of precision mechanical measuring devices • procedures for adjusting and maintaining precision mechanical measuring devices • procedures for storing precision mechanical measuring devices • hazards and control measures associated with precision mechanical measurement, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform precision mechanical measurement. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where

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EVIDENCE GUIDE	
	assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with other units addressing the safety, quality, communication, materials handling, recording and reporting associated with precision mechanical measurement or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Equipment	Strip gauges, engineering squares, angle dekkors,

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RANGE STATEMENT	
	sine bars, angle gauges, polygons, dividing heads, rotary tables, precision levels, micrometers, height gauges, hardness testers, and texture measuring equipment
Appropriate measuring techniques	Includes considerations of the suitability of the environmental conditions for measurements being taken
Measurements	Length, circular, straightness, flatness, hardness, angles, finishes, textures, roundness, squareness, alignment and coordinate measurement etc. on components or equipment

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Measurement

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MEM12005B Calibrate measuring equipment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers checking measuring equipment for correct operation, and validating/calibrating precision measuring equipment in accordance with predetermined procedures.

Application of the Unit

Application of the unit	This unit applies to the calibration skills used in the setting, adjustment, validation or verification of precision mechanical and/or electrical/electronic measuring instruments using reference standards in accordance with predetermined standard procedures. This may involve the use of electronic setting equipment and the selection or determination of an appropriate external standard in accordance with standard operating procedures. This unit is not meant to apply to simple zeroing, external adjustment or manual adjustment for size range e.g. micrometers etc; these skills are covered by Unit MEM12023A (Perform engineering measurements), Unit MEM12003B (Perform precision mechanical measurement) or Unit MEM12004B (Perform precision electrical/electronic measurement) as appropriate. There may be occasions when both pathways MEM12003B and MEM12002B will be required. Where additional electrical/electronic measurement skills are required, then Unit MEM12004B (Perform precision electrical/electronic measurement) should be considered. Competence in this unit does not require the level of skill that applies to calibration as defined in ISO 9000 and/or carried out by personnel accredited under ISO/IEC 17025/NATA certification or similar. Unit MEM15010B (Perform laboratory procedures) should be considered for this level of calibration.

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	Where reference standards only are to be verified under laboratory conditions, then MEM15022B (Verify reference standards) should be considered. **Band**: **B** **Unit Weight**: **6**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM12003B	Perform precision mechanical measurement
	MEM12023A	Perform engineering measurements
Path 2	MEM12002B	Perform electrical/electronic measurement
	MEM12023A	Perform engineering measurements

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range

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	statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Check equipment for correct operation	1.1. Appropriate checks are made of components, leads, fasteners, etc. for wear, loose connections or other faults.
2. Validate/calibrate precision measuring equipment	2.1. Calibration of precision measuring equipment is assessed to manufacturers' specifications and/or standard operating procedures. 2.2. Equipment is calibrated against appropriate physical standards using correct calibration devices, equipment, techniques using predetermined procedures. 2.3. Equipment is recommissioned in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- interpreting work requirements
- using appropriate tools and equipment to check measuring equipment for faults
- using appropriate techniques to check the calibration of the measuring equipment for conformance to specifications
- calibrating the measuring equipment against the appropriate physical standard
- recommissioning the measuring equipment
- using literacy and numeracy skills to enable correct completion of calibration records

Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE
Look for evidence that confirms knowledge of: • measuring equipment specifications, operation, wearing parts, connections and components • checks that are to be made of the measuring equipment and the tools and equipment to be used when checking the measuring equipment • common fault(s) that may be found in the measuring equipment • effects of faults on the performance/accuracy of the measuring equipment • general knowledge of standards, legislative or regulatory requirements applicable to the measuring equipment and/or its calibration • standard operating procedures for calibrating the measuring equipment and the tools and equipment required to do so • standard operating procedures for commissioning the measuring equipment • calibration records to be kept/maintained in accordance with standard operating procedures • hazards and controls associated with calibrating measuring equipment

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to check equipment for correct operation and validate/calibrate precision measuring equipment. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must

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EVIDENCE GUIDE	
	be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with calibrating measuring equipment or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Calibration	To standardise the quantities of a measuring instrument

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RANGE STATEMENT	
Physical standards	Reference standards of mass length, time, temperature, pressure, volume, process characteristics etc.
Calibration devices, **equipment**	Micrometer, vernier caliper, voltmeter, oscilloscope, all types of comparators, jigs and fixtures, templates and patterns etc.
Techniques	In standard operating procedures, manufacturers' manuals
Recommissioned	Sealing, tagging, identification or storage in accordance with standard operating procedures

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Measurement

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MEM12006C Mark off/out (general engineering)

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers marking off/out by transferring dimensions from engineering drawings, prints or plans to engineering items that are to be either manufactured or set up. Dimensions may be directly transferred or may require calculation from information on the drawings, prints or plans.

Application of the Unit

Application of the unit	This unit of competency applies to marking off/out techniques used for the transfer of dimensions from engineering drawings, prints or plans to items that are to be set up or manufactured, for example, engineering components, jigs and fixtures, castings, templates, dies and tooling. This unit has been developed for Engineering Tradesperson - Mechanical apprenticeship training and the recognition of trade level skills in mark off/out in general engineering. Skills covered by this unit are generally applied in occupational and work situations associated with trade level fitting, machining and toolmaking work. Marking off/out is undertaken using appropriate tools and equipment and templates are produced as required. Marking off/out techniques may apply to a range of materials and shapes. The task may be performed in a workshop or in situ. This unit is not intended to cover the skills used in a simple transfer of a dimension or marking a location point associated with general engineering and maintenance functions. For these skills refer to MEM07005C Perform general machining, MEM18006C Repair and fit engineering components or MEM18014B Manufacture

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	press tools and gauges. Where a higher level of calculation, measurement or precision work is required, see MEM30012A Use mathematical techniques and perform simple statistical computations, MEM12003B Perform precision mechanical measurement or MEM18003C Use tools for precision work, respectively. For marking out structural fabrications and shapes, refer to MEM12007D Mark off/out structural fabrications and shapes. This unit covers the marking out skills only. When the manufacture of templates is required, other appropriate units may need to be selected. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine job requirements	1.1. Drawings, job instructions and specifications are interpreted and understood 1.2. Appropriate methods and sequencing are selected consistent with proposed manufacturing process using standard operating procedures
2. Transfer dimension	2.1. All marking off/out is carried out to specifications using appropriate tools and equipment 2.2. Datum points are correctly established 2.3. Dimensions are transferred and correct and appropriate calculations are used where required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- determining job requirements
- transferring dimensions
- applying method and sequence of marking out
- making templates as required
- establishing datum points
- reading and interpreting routine information on written job instructions, specifications standard operating procedures and engineering drawings

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REQUIRED SKILLS AND KNOWLEDGE
• performing calculations using formulae • locating, reading and interpreting information on written job instructions, specifications, drawings, charts, lists and other reference documentation • checking and clarifying strategies
Required knowledge
Required knowledge includes: • drawings, job instructions and specifications • procedures for marking off/out • tools, equipment and techniques related to the task • purpose of establishing datum points • method of determining/calculating dimensions • use and application of personal protective equipment • safe work practices and procedures • relevant hazards and control measures related to the competency

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to mark off/out in a general engineering situation. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different workplace situations and contexts. Critical aspects of assessment and evidence include: • examination of detailed drawings for marking out requirements and specifications including materials, measurements and tolerances, manufacturing methods, standards and code requirements • correct calculation of measurements not shown on

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EVIDENCE GUIDE	
	drawings • sequence of measuring and/or development is determined correctly • correctly establishing and marking datum points • measurements are accurately transferred to component, jig, fixture, casting, template, die or tooling • accurate production of templates.
Context of and specific resources for assessment	This unit has been developed to support training in and recognition of trade level competency in marking off/out general engineering items as applied to trade level fitting, machining and toolmaking work environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.
Method of assessment	Typically, persons engaged in Engineering Tradesperson - Mechanical work are required to apply their geometric development skills and techniques across a range of jobs and specifications. A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with marking off/out general engineering items or other units requiring the exercise of the skills and knowledge covered by this unit. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Marking off/out	Marking off/out may include engineering components, jigs and fixtures, castings, templates, dies and tooling
Tools and equipment	Tools and equipment may include: • marking out tables • surface tables • rotary tables • dividing heads • vee blocks • cylinder squares • sine bars • vernier height gauges • protractors • straight edge and set squares • hammers • scribers

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RANGE STATEMENT	
	• centre punch • marking medium

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Measurement

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MEM12022B Program coordinate measuring machines (advanced)

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers writing, trialling and editing programs for coordinate measuring machines to measure features of parts in multiple planes using multiple probes.

Application of the Unit

Application of the unit	The skills in this unit extend to writing programs to measure features of parts in multiple planes using multiple probes. The program produced may be used on a range of coordinate measuring machines and would be suitably archived and backed up. Programs are trialled and edited as necessary. Work would be undertaken autonomously using predetermined standards of quality. For programming using single probes in a single plane, Unit MEM12021B (Program coordinate measuring machines) should be selected. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12003B	Perform precision mechanical measurement
	MEM12023A	Perform engineering measurements

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine program requirements	1.1. Part parameters and measurement requirements are determined. 1.2. Program attributes are established according to standard operating procedures.
2. Determine probe configuration for multiple probes	2.1. Probe configuration is determined according to standard operating procedures. 2.2. Probe angles are determined and multiple probes are qualified.
3. Create multiple Direct	3.1. Multiple DCC alignment is created according to

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ELEMENT	PERFORMANCE CRITERIA
Computer Control (DCC) alignment	standard operating procedures. 3.2. DCC sub-routines are integrated.
4. Construct advanced geometric features	4.1. Geometric features are determined and constructed. 4.2. Features are dimensioned according to standard operating procedures.
5. Review and maintain part programs/system	5.1. Part programs are reviewed/edited to comply with changes to specifications. 5.2. System wide options are changed. 5.3. Programs are archived and backed up according to standard operating procedures. 5.4. Results are output to various formats according to standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • determining program parameters from written job instructions, specifications, charts, lists, drawings and other applicable reference documents • selecting the correct units for the job requirements • selecting suitable probes and determining probe configuration • determining and qualifying probe angles for each probe • creating multiple DCC alignment • integrating new and/or existing DCC sub-routines • constructing geometric features for the program • reviewing and editing program to specification • changing system wide operations to ensure the most efficient operation of the program • checking that the integrity of the system is maintained • archiving and backing up • outputting results output to printer, disc or other formats • planning and sequencing operations/processes • checking and clarifying information

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REQUIRED SKILLS AND KNOWLEDGE

- completing workplace documents and short reports
- checking for conformance to specifications
- undertaking calculations for determining program parameters and checking tolerances
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit
- following verbal instructions
- orally reporting information

Required knowledge

Look for evidence that confirms knowledge of:

- program specifications
- the procedure for producing the program
- the parameters for selecting attributes
- the reason for selecting multiple probes
- the procedure for determining multiple probe configuration
- the procedure for determining probe angles
- the qualification procedure
- the procedure for creating DCC alignment
- the critical differences between single and multiple DCC alignment
- problems due to integrating sub-routines
- advantages gained through integration of DCC sub-routines
- the procedure for constructing geometric features
- reasons for constructing features in the sequence followed
- the procedure for ensuring the dimensioning techniques comply with relevant standards
- the procedure for ensuring all notes/instructions are clear and logical
- the procedures and parameters for editing, archiving and backing up programs
- the effects of editing particular sections of the program
- the effects on other programs of changing software or hardware options
- the procedures for changing system-wide options
- the list of recipients or those with access rights to the programs
- the procedures for producing/storing results/reports
- the procedure for notifying personnel of completion of the program is explained
- techniques, tools and equipment to measure components
- hazards and control measures associated with advanced CMM programming, including housekeeping
- use and application of personal protective equipment
- safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform advanced programming of a coordinate measuring machine. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with advanced programming of a coordinate measuring machine or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any

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EVIDENCE GUIDE	
	relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Measurement

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MEM12023A Perform engineering measurements

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing measurement skills requiring straightforward use of mechanical measuring devices and associated calculations.

Application of the Unit

Application of the unit	This unit covers straightforward measurement using devices which incorporate visual indications representing units of measurement. It applies to the use of measuring devices in a range of manufacturing, engineering and related environments. It includes, where required, adjustment of measuring devices through simple means and typically includes zeroing or scale adjustment. Measurements may be expressed in metric or imperial units. All measurements are undertaken to standard operating procedures. Electrical/electronic devices used are those not requiring the connection or disconnection of circuitry. Work is undertaken autonomously or part of team environment, in the field, work station or workshops. For straightforward use of comparison or pre-set measuring devices, Unit MEM12001B (Use comparison and basic measuring devices) should be accessed. **Band**: **A** **Unit Weight**: **5**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Select appropriate device or equipment	1.1. Measurement requirements are determined from specifications. 1.2. Appropriate device or equipment is selected according to standard operating procedures, to achieve required outcome.
2. Obtain measurements using a range of measuring devices	2.1. Correct and appropriate measuring technique is used. 2.2. Measurements are accurately obtained .

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Dimensions are determined or verified using basic calculations, where required.
3. Maintain measuring devices	3.1. Routine care and storage of devices is undertaken to manufacturers' specifications or standard operating procedures. 3.2. Routine adjustments to devices are made and checked.
4. Communicate measurements as required	4.1. Measurements are accurately recorded, where required. 4.2. Freehand sketch which depicts required information is prepared, as required.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- selecting the appropriate measuring device for given measuring tasks
- using appropriate measuring technique
- reading all measurements taken accurately to the finest graduation of the selected measuring device
- handling and storing measuring devices in accordance with manufacturers' specifications or standard operating procedures
- verifying all measuring devices before use
- making, where appropriate, routine adjustments to measuring devices
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying task related information
- checking for conformance to specifications
- undertaking numerical operations involving addition, subtraction, multiplication, division, fractions and decimals within the scope of this unit
- preparing drawings as required

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge
Look for evidence that confirms knowledge of: • correct application of a range of measuring devices • correct and appropriate measuring technique for a range of measuring devices • addition, subtraction, multiplication, division, fractions, decimals to the scope required by this unit • procedures for handling and storing a range of measuring devices • procedures for adjusting and zeroing a range of measuring devices • methods of communicating measurements by drawings, as required • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform engineering measurements.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication,

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EVIDENCE GUIDE	
	materials handling, recording and reporting associated with performing engineering measurements or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Specifications	Drawings, sketches, job instructions, schematics, diagrams, technical manuals
Range of measuring devices	Protractors, combination squares, set squares, dial indicators, thermometers, tapes, rules, micrometers, vernier-scaled measuring equipment
Basic calculations	Calculations needed to assist in determining measurements where a reading of the graduated device is not sufficient, for example subtracting one measurement from another to give a third

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RANGE STATEMENT	
	measurement. Examples of calculations needed are addition, subtraction, multiplication, division, fractions and decimals. Calculations may be made using a calculator
Routine adjustments	Validating the device using simple zeroing or scale adjustment
Measurements	Measuring length, squareness, flatness, angle, roundness, clearances or any other measurements that can be read off analog, digital or other measuring device
Information	Dimensions, instructions, base line or datum points

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Measurement

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MEM12024A Perform computations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers estimating approximate answers to arithmetical problems, carrying out basic calculations involving percentages and proportions, and determining simple ratios and averages. The unit includes producing and interpreting simple charts and graphs.

Application of the Unit

Application of the unit	This unit applies in manufacturing, engineering or related environments. It includes the application of the four rules of algebraic expressions, extracting information from drawings, diagrams, graphs and charts and producing simple charts and graphs. Data may be derived from readings taken or may be computer generated. Applications can include computations associated with pressure, volume, temperature, heat, speed, power, elasticity, density, mass, force etc. Calculations may be performed using pen and paper or on a calculator. **Band**: **A** **Unit Weight**: **3**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine work requirement	1.1. Required outcomes are established from job instructions. 1.2. Data is obtained from relevant sources and interpreted correctly. 1.3. Required calculation method is determined to suit the application, including selection of relevant arithmetic operations and/or formulae. 1.4. Expected results are estimated, including rounding off, as appropriate.
2. Perform calculations	2.1. Calculation method is applied correctly. 2.2. Correct answer is obtained. 2.3. Answer is checked against estimation.

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ELEMENT	PERFORMANCE CRITERIA
3. Produce charts and graphs from given information	3.1. Data is transposed accurately to produce charts or graphs. 3.2. Charts or graphs accurately reflect data on which they are based.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- performing calculations involving whole numbers using all four basic rules
- performing calculations involving length, perimeter, area and volume
- checking calculated answers for accuracy
- rounding off estimated answers
- expressing information presented in fractional or decimal format as a percentage
- selecting appropriate formulae for the given application
- substituting the correct values for each term in the relevant formulae
- using appropriate mathematical operations
- performing calculations involving ratios or proportions
- determining required information from appropriate charts or graphs
- producing simple charts or graphs from given information or observations made
- selecting appropriate scales and using them in the production of charts and graphs
- marking appropriate limits clearly on the graph or chart
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying task related information
- checking for conformance to specifications
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Look for evidence that confirms knowledge of:

- formula applicable to the determination of perimeter, area and volume of simple

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REQUIRED SKILLS AND KNOWLEDGE
geometric shapes • techniques for estimating approximate answers • reasons for using dimensions with the same units when calculating length, perimeter, area and volume • concepts of perimeter, area and volume • procedures for rounding off figures when estimating approximate answers • mixed numbers, decimals, fractions and whole numbers • concept of percentage • procedures to be followed in converting a decimal to a percentage • procedures for carrying out calculations involving fractions and using each of the four basic rules • procedures to be followed on converting a fraction to a percentage • sources of appropriate formulae • reasons for ensuring that the units of each term are consistent with the formulae selected • procedures for converting given units to those required for use in formulae • concepts of ratio and proportion • given ratios and proportions can be expressed in terms of whole numbers, fractions and decimal fractions • scales applicable to the axes of the graphs or charts • three types of charts and/or graphs used in the individual's field of work • where appropriate, upper and lower limits of acceptability applicable to data entered on a graph or chart • where appropriate, the trends indicated by the slope or gradient of a graph • where appropriate, the action to be taken when given trends occur or set limits are approached on graphs or charts • procedures for drawing 'lines of best fit' • the trends indicated by the graphs or charts drawn • hazards and control measures associated with performing computations, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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EVIDENCE GUIDE	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform computations.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing computations or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Relevant sources	Charts, graphs, diagrams, measurement data, reference manuals and specifications
Application	Applications can include computations associated with pressure, volume, temperature, heat, speed, power, elasticity, density, mass, force etc.
Arithmetic operations	• Application of subtraction, addition, multiplication and division • Manipulation of decimals, fractions and mixed numbers and whole numbers • Determining of percentages • Performing of algebraic expressions • Calculation of proportions and ratios
Charts and graphs	Simple histograms, control charts, pie charts etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Measurement

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MEM12025A Use graphical techniques and perform simple statistical computations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers interpreting and constructing graphs and charts from given or determined data, and performing basic statistical calculations.

Application of the Unit

Application of the unit	Graphs and charts may be applied to information from various work contexts, quality processes, production and market trends and other engineering applications. A range of devices may be used to assist with calculations. This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C5 (AQF level V). **Band**: **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM12024A	Perform computations

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Read and construct graphs from given or determined data	1.1. Complex information is extracted from graphical representation. 1.2. Data is analysed with respect to emerging trends. 1.3. Graphs are constructed as required from data and drawn with respect to scale and accepted method. 1.4. Significant features of graphical representation are understood such as limit lines, gradients (straight line graphs), intercepts, maximum and minimum values. 1.5. A wide variety of graphs are constructed as required including histograms, control charts, straight line graphs and parabolic graphs.
2. Perform basic statistical calculations	2.1. Mean, median and mode are calculated from given data. 2.2. Standard deviation is calculated. 2.3. Application of standard deviation and limits to

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ELEMENT	PERFORMANCE CRITERIA
	process improvement techniques is understood.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • obtaining required information by interpreting data presented in graphical form • determining the trend(s) indicated by the data presented in graphical form • constructing graphs to scale • labelling the axes appropriately • selecting scales appropriate to the purpose for which the graph is intended • constructing histograms, control charts, straight line and parabolic graphs • determining for a given set of data the mean, median and mode • determining for a given set of data the standard deviation • reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • planning and sequencing operations • checking and clarifying task related information • checking for conformance to specifications • undertaking numerical operations, geometry and calculations/formulae within the scope of this unit
Required knowledge
Look for evidence that confirms knowledge of: • characteristics of straight line, parabolic and hyperbolic curves • procedures for determining the slope/rate of change of a curve • the trend(s) indicated by changes in gradient of a graph • procedures for drawing the line of best fit for the coordinates plotted • standard form of equations relating to straight lines and parabolic curves • gradient, intercepts, maximum and minimum values and limit lines for straight line and parabolic curves • function of control charts • the meaning of the terms mean, median and mode

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REQUIRED SKILLS AND KNOWLEDGE
• the meaning of the term standard deviation • the significance of 1, 2 and 3 sigma limits • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to use graphical techniques and perform simple statistical computations. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using graphical techniques and performing simple statistical computations or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct

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EVIDENCE GUIDE	
	observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Process improvement techniques	Techniques in which error rates are mathematically calculated and recorded such as three sigma and six sigma **NOTE**: This unit gives the underpinning calculation skill for these techniques and does not cover the implementation or use of three or six sigma systems

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Measurement

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MEM13001B Perform emergency first aid

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing basic emergency first aid, EAR (expired air resuscitation) and CPR (cardiopulmonary resuscitation).

Application of the Unit

Application of the unit	This unit applies to administration of basic emergency first aid treatment and the management of life threatening situations where an unconscious person requires expired air resuscitation (EAR) and cardiopulmonary resuscitation (CPR). This unit does not meet all of the requirements expected of designated First Aid Officers. The competencies required for situations involving isolation of persons from hazardous electrical situations are covered in Unit MEM18049C (Disconnect/reconnect fixed wired equipment up to 1000 volts a.c. and 1500 volts d.c.) and Unit MEM10003B (Install and test electrical wiring and circuits up to 1000 volts a.c. and 1500 volts d.c.). **Band**: **A** **Unit Weight**: **1**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Perform emergency first aid	1.1. Correct procedures for EAR (expired air resuscitation) and CPR (cardiopulmonary resuscitation) are demonstrated on a mannequin. 1.2. First aid treatment of injuries is carried out correctly. 1.3. Details of first aid administered are accurately recorded. 1.4. Understanding of relevant regulatory and legislative requirements is demonstrated.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- planning and sequencing operations
- checking and clarifying task-related information
- performing EAR (expired air resuscitation) and CPR (cardiopulmonary resuscitation) on a mannequin
- simulated first aid treatment for the full range of injuries covered by the range statement
- reading, interpreting and following emergency first aid procedures and related documents
- entering information onto proformas and other relevant documents
- communicating effectively with injured persons, appropriate personnel and authorities

Required knowledge

Look for evidence that confirms knowledge of:

- applicable regulatory and legislative requirements
- use and application of any applicable personal protective equipment
- hazards and control measures associated with performing emergency first aid, including housekeeping
- instances where EAR and CPR should be performed
- procedures for preparing a person for the administration of EAR and CPR
- procedures for performing EAR and CPR on a child and an adult
- dangers and precautions to be taken when administering EAR and CPR
- emergency first aid procedures for injuries covered by the scope of this unit
- details to be recorded of first aid administered
- procedures and reasons for recording first aid administered
- relevant regulatory and legislative requirements with respect to emergency first aid
- the impact of regulatory/legislative requirements on the individual and others
- safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform emergency first aid.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing emergency first aid or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Injuries	Burns/scalds, fractures, cuts and abrasions, poisoning, foreign bodies in eyes, concussion and shock

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Occupational health and safety

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MEM13002B Undertake occupational health and safety activities in the workplace

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers applying principles of Occupational Health and Safety (OHS) in the workplace and undertaking a safety risk assessment for the employee's area of responsibility.

Application of the Unit

Application of the unit	This unit applies to employees requiring additional OHS competencies beyond those inherent in their job. **Band**: **A** **Unit Weight**: **3**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Apply principles of OHS in a workplace	1.1. Basic OHS principles of hazard identification, risk assessment and control are described. 1.2. Understanding of OHS legislation as it is applied in the workplace is demonstrated.
2. Carry out safety audit	2.1. Regular safety audits in the area of responsibility are carried out in accordance with appropriate OHS standards.
3. Identify health and safety improvements	3.1. OHS issues and suggestions for improvements are made to OHS Representatives and Committees as appropriate. 3.2. On the basis of safety audits or as required, hazards are identified and recommendations for their control are made. 3.3. Contributions to safety improvements are made using standard operating procedures. 3.4. OHS training needs are identified.
4. Follow requirements of enterprise OHS program	4.1. Requirements of the OHS program are satisfied within the area of responsibility. This includes for example, accident investigation and emergency procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- performing safety audits
- making safety improvements
- initiating OHS training
- meeting requirements of the OHS program and procedures in the individual's area(s) of responsibility
- reading and interpreting audit and safety-related documentation
- following audit and OHS procedures
- entering information onto audit reports and other relevant documents
- communicating effectively about OHS activities with workplace personnel

Required knowledge

Look for evidence that confirms knowledge of:

- principles of hazard identification, assessment and control as applied to the workplace
- procedures for hazard identification, assessment and control
- application of OHS legislation in the workplace
- procedures for conducting safety audits
- safety standards applicable to the individual's area(s) of responsibility
- the frequency at which safety audits should be conducted
- procedures for implementing OHS improvements
- the means of rectifying given or identified hazards
- reasons for selecting the chosen means of rectifying the hazard
- the authority to whom recommended OHS improvements are to be reported
- procedures for making safety improvements
- requirement for OHS training in the individual's area(s) of responsibility
- objectives of OHS training
- procedures for initiating OHS training
- accident investigation procedures
- emergency OHS procedures
- the role of the individual in carrying out accident investigations and emergency procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to undertake OHS activities in the workplace.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with undertaking occupational health and safety activities in the workplace or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Risk assessment	Risk assessment is a process that involves:
	• analysing the risk to identify influencing factors and the range of potential consequences
	• assessing:
	  • the effectiveness of existing controls
	  • the likelihood of each consequence considering exposure and hazard level
	• and combining these in some way to obtain a level of risk

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Co-requisite units		

Competency field

Competency field	Occupational health and safety

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MEM13003B Work safely with industrial chemicals and materials

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers using personal protective equipment (PPEs), identifying the particular hazards and emergency procedures, and observing safe working practices in that environment.

Application of the Unit

Application of the unit	This unit may be applied in a workplace in which materials and chemicals which are subject to codes and regulations are stored and used, for example, chemicals, solvents, dangerous materials, acids, noxious waste products etc. Evidence of competency is to encompass the satisfactory application of current State/Territory OHS legislation, standards and codes of practice, and the hierarchy of hazard control measures with elimination, substitution, isolation and engineering control measures being selected before safe work practices and PPEs. This unit describes the competencies which are beyond those safety requirements normally applied in the workplace as described in Unit MEM13014A (Apply principles of occupational health and safety in the work environment) or specifically described in individual units such as welding. **Band**: **A** **Unit Weight**: **2**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Use personal protective equipment	1.1. Correct and appropriate safety clothing including personal protective equipment is selected and used correctly based on information in relevant material safety data sheet (MSDS).
2. Identify emergency procedures	2.1. Emergency procedures and plan relevant to the particular work environment are documented, understood and demonstrated as laid down in approved safety instructions.

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ELEMENT	PERFORMANCE CRITERIA
3. Observe safe working practices	3.1. Hazardous areas and materials are identified and special handling procedures are identified and understood. 3.2. Permits to work (if necessary) are obtained. 3.3. All equipment and hazardous materials are used in accordance with relevant OHS legislation, manufacturers' instructions and standard operating procedures. 3.4. All site-specific safety policies, safety signs, symbols and labels are correctly identified and understood. 3.5. Material safety data sheets are understood and applied. 3.6. Safe manual handling procedures (including equipment) are used. 3.7. Decanted chemicals and storage is to State/Territory dangerous goods and OHS legislation and requirements. 3.8. Housekeeping duties are performed according to standard operating procedures to maintain a safe working environment.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • undertaking risk assessment • communicating with others • performing proper manual handling techniques • interpreting safety signage, labelling and placarding
Required knowledge
Look for evidence that confirms knowledge of: • dangerous goods classification and labelling/placarding • testing, use and maintenance of PPE

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REQUIRED SKILLS AND KNOWLEDGE
• inherent hazardous properties of the chemicals to be used • interpretation of the relevant MSDS • basic fire fighting procedures • site-specific emergency plan procedures • chemical spill confinement procedures • dangerous occurrence (near miss) reporting procedures • hierarchy of control

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to work safely and efficiently with various chemicals.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with working safely with industrial chemicals and materials or other units requiring the exercise of the skills and knowledge covered by this unit.

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EVIDENCE GUIDE	
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Personal protective equipment	Personal protective may include appropriate: • goggles/face shields • respirators • air supplied or self-contained helmets • safety boots, gloves and appropriate clothes/garments
Safe working practices	• Environment is inspected • Hazards (and chemical reactive hazards) are assessed and controlled using hierarchy of hazard control • Properly maintained PPE is available • Emergency management plan is documented/understood

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RANGE STATEMENT	
	• Work to be undertaken in safe 'thermal' environments and all possible ignition sources are to be identified and controlled
Storage	All storage containers (minor quantities and in consumer packages) are suitable for chemical exposure and are properly labelled and/or placarded. Chemical manifests are updated at completion of work activity
State or Territory legislative requirements	Appropriate OHS, dangerous goods acts and regulations, Australian standards, Australian Code for the Transport of Dangerous Goods by Road and Rail (ADGC), NOHSC codes of practice

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Occupational health and safety

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MEM13004B Work safely with molten metals/glass

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers working safely with molten metals or glass including the appropriate using personal protective equipment (PPE), identifying and responding to emergency procedures, observing safe work practices, and identifying the hazardous conditions in a heavy engineering environment.

Application of the Unit

Application of the unit	This unit may be applied in all workplaces in which there is molten metal or molten glass, for example, in foundries, die casting operations, glass or molten glass operations, explosives manufacture. Evidence of competency is to encompass the satisfactory application of any current State/Territory OHS legislation, standards and codes of practice, and the hierarchy of hazard control measures with elimination, substitution, isolation and engineering control measures being selected before safe work practices and personal protective equipment. This competency is to be exhibited in accordance with all relevant OHS legislation. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify the need for the use of personal protective equipment	1.1. Appropriate personal protective equipment is identified and used correctly, as specified in standard operating procedures (SOP) and OHS information relating to the specific hazard(s).
2. Adhere to emergency procedures for working with molten metal and glass	2.1. Emergency equipment is located and used in accordance with workplace policies and procedures. 2.2. Responses to emergency procedures are demonstrated as detailed in approved safety procedures and instructions.
3. Identify, assess and control hazardous	3.1. Hazards are identified and reported and planning is undertaken to maintain a healthy and safe work

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ELEMENT	PERFORMANCE CRITERIA
conditions operating in a heavy engineering environment	environment. 3.2. Workplace procedures and work instructions for controlling risks are followed accurately.
4. Observe good OHS practices	4.1. Hazardous areas and materials associated with molten metal/glass are identified and potential risks are identified. 4.2. Safety signs and symbols are identified and understood. 4.3. Equipment (including personal protective equipment) is used according to specifications and standard operating procedures. 4.4. Personal protective equipment is inspected and maintained in good order and stored for reuse. 4.5. Hazardous items associated with task are identified and removed from hot material area if required and assessed and controlled. 4.6. Housekeeping duties are performed according to standard operating procedure to maintain a safe working environment and include the safe use, accessibility and maintenance of PPEs.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • using appropriate personal protective equipment • responding to emergency procedures (fires, accidents etc.) • handling hazardous materials and equipment within the scope of this unit • maintaining equipment • housekeeping • identifying and reporting hazardous conditions and taking actions to rectify hazards • interpreting text and numerical (e.g. quantities, units of measurement) information on material safety data sheets, safety signs, symbols and labels • using manual handling techniques

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge
Look for evidence that confirms knowledge of: • hazards, hazardous areas and materials and hazard control measures associated with molten metal/glass • hierarchy of control • procedures relevant to raising OH&S issues • rights and responsibilities of workplace parties under OH&S acts, regulations, codes of practice etc. • designated personnel responsible for OH&S • applicable personal protective equipment • emergency procedures • safety signs, symbols and labels • procedures for correct inspection and service of equipment including personal protective equipment • routine maintenance procedures for equipment • workplace procedures for working in hazardous areas • the consequences of not maintaining a clean and safe working environment • specific hazards associated with the work environment/industry • safe manual handling procedures • location of emergency equipment including first aid facilities

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to work safely with molten metals/glass.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for	This unit may be assessed on the job, off the job or a

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EVIDENCE GUIDE	
assessment	combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with working safely with molten metals/glass or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Personal protective equipment	• Face protection • Eye protection • Respiratory protection • Hearing protection • Hand protection • Clothing and footwear protection
Risk	Likelihood and consequences of injury or damage
Hazardous material	• Hot material • Molten metals • Molten glass and associated products etc. • Explosive materials

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Occupational health and safety

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MEM13010A Supervise occupational health and safety in an industrial work environment.

Modification History

Single band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit covers supervising implementation of OHS practices and procedures in a section of a workplace that is within an industrial workplace.

Application of the Unit

Application of the unit	This unit applies to a person who requires the skill and knowledge to supervise others in the implementation and monitoring of occupational health and safety (OHS) of a workplace section. It applies to manufacturing, production, engineering and related industry environments. **Band:** This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C5 (AQF level V). **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units		
Path 1	MEM13002B	Undertake occupational health and safety activities in the workplace

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Implement OHS procedures for work site or section	1.1. Legislative requirements for the work section and work supervisor are identified. 1.2. Consultation mechanisms are established for the work section. 1.3. Personal Protective Equipment (PPE) is allocated to all staff as required. 1.4. Safety and housekeeping practices and procedures are established for the work site or section. 1.5. Tools and equipment are checked for suitability and serviceability. 1.6. Safety monitoring procedures are established. 1.7. Non-conformances with legislative requirements are

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ELEMENT	PERFORMANCE CRITERIA
	assessed and addressed.
2. Assess risks in the work site or section	2.1. Hazards in the work site or section are identified. 2.2. Risks are assessed.
3. Apply risk management strategies for work section	3.1. Appropriate risk control measures are implemented. 3.2. Control measures are assessed for effectiveness in controlling the risk. 3.3. Hazards are monitored. 3.4. The need for expert advice to manage risks is determined. 3.5. Accident investigations are conducted as required to determine cause.
4. Supervise others in the implementation of OHS procedures in the work site or section	4.1. Communication on OHS matters is supervised. 4.2. OHS training needs are identified for the work section. 4.3. Workplace OHS training and communication activity is coordinated, evaluated and documented according to legislative requirements and organisational procedure. 4.4. Statutory OHS training requirements are coordinated and documented according to legislative requirements and organisational procedure.
5. Maintain records and statistics	5.1. Accident/incident records are maintained. 5.2. Records are analysed for trends, and particular problem areas are identified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • keeping records/minutes of discussions with consultative forums on OHS matters • scheduling meetings with the relevant consultative forums to discuss OHS matters • participating in consultative forums • communicating with staff regarding OHS matters

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REQUIRED SKILLS AND KNOWLEDGE

- identifying OHS training needs in the workplace
- supervising OHS training implementation
- interpreting and following information on OHS legislation, workplace practices and procedures, written job instructions, specifications, standard operating procedures, charts, lists, and other applicable reference documents
- keeping records for monitoring the effectiveness of work practices and procedures with respect to the safety of the working environment
- investigating accidents in accordance with standard workplace procedures
- obtaining results of safety audits in accordance with workplace procedures
- obtaining expertise external to the workplace to assist in the identification and control of workplace hazards
- maintaining accident and incident records in accordance with standard workplace procedures

Required knowledge

Look for evidence that confirms knowledge of:

- legislative requirements for the workplace and supervisory responsibilities
- procedures for initiating discussions with the relevant consultative forums
- relevant consultative forums
- the frequency of discussions to be held with the relevant consultative forums
- organisational OHS communication requirements
- OHS training practices, procedures and options available
- work practices and procedures developed in conjunction with the relevant consultative forums
- the effect of work practices and procedures on the safety of the working environment
- procedures for monitoring the success of the work practices and procedures developed
- variables to be recorded during the monitoring process
- sources of information on occupational health and safety issues
- procedures for conducting accident investigations
- the hierarchy of hazard control measures
- reasons for progressively implementing the hierarchy of control of hazards
- the likely causes of accidents investigated
- principles of hazard control
- the mechanisms for controlling hazards
- the areas of occupational health and safety for which the workplace lacks acknowledged expertise
- procedures for accessing expertise external to the workplace
- procedures for recording accidents and incidents
- the probable causes of trends or problem areas

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REQUIRED SKILLS AND KNOWLEDGE
• hazards and control measures relevant for the work site or section, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to supervise occupational health and safety in an industrial work environment. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with supervising occupational health and safety in an industrial work environment or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be

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EVIDENCE GUIDE	
	gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Consultation mechanisms	OHS committees, OHS representation, toolbox meetings, safety meetings, record keeping systems
Personal Protective Equipment	Safety boots, gloves, goggles, glasses, ear muffs, hard hats, clothing, respirators or masks, reflective vests
Safety and housekeeping practices and procedures	Emergency/evacuation procedures, tool and equipment cleaning, maintenance and storage procedures, safety reporting and documentation procedures, barricades and signage, procedures for managing hazardous chemicals and materials
Hazards	Risks associated with tools and equipment, lighting, gases, electricity and water, toxic and hazardous substances, flammable materials and fire hazards, lifting practices, working in confined spaces, working at height, spillage, waste and

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RANGE STATEMENT	
	debris, noise, mobile plants such as forklifts and front end loaders, moving parts of machinery, gravity (falls from heights), dusts
Risks	The chance of something happening that will result in injury or damage. It is measured in terms of consequences and likelihood
Risk control measures	Elimination of the hazard, substitution with a lesser hazard, isolation of personnel from the hazard, engineering controls, administrative controls (e.g. procedures and training), personal protective equipment
Communication	Signage and labelling, hazard identification notices, access to policies, procedures, SOPs, etc., meeting notices, documentation procedures, reporting procedures, meetings
Supervised	Coordinated, implemented, referred, delegated, facilitated, monitored, documented
Training needs	Induction programs, technical training, coaching and mentoring, supervision, specialist training, on site/off site, involvement of training specialists, organisational training requirements, referral to training personnel

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Occupational health and safety

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MEM13013B Work safely with ionizing radiation

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers working safely with ionizing radiation when performing radiographic testing in a range of industrial applications.

Application of the Unit

Application of the unit	This unit applies to safely working with ionizing radiation in open or closed sites: on fabrications, structures and components across a wide range of industries. It is a prerequisite to undertaking any other radiographic competency standards unit. The work can relate to scheduled and unscheduled maintenance activities, using general tools, specific radiographic testing equipment as specified in maintenance documentation, testing procedures or operator instructions. All testing must be completed with particular attention to personal and OH&S regulations. Certification against Australian standards may be achieved where assessment in this unit of competency is carried out in conjunction with an examining authority as described in ISO 9712. Materials and chemicals which are subject to codes and regulations - for example, chemicals, explosives, solvents, dangerous materials, acids, or noxious waste products - must be subject to safe work habits must be stored and used in accordance with safe work practices. **Band**: **A** **Unit Weight**: **4**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify the hazards and effects of ionizing radiation in the workplace	1.1. The source of ionizing radiation is identified in accordance with relevant organisational policy and procedures. 1.2. Production of X-rays and gamma rays is explained in relation to radiographic testing activities. 1.3. Attenuation factors of ionizing radiation and the biological effects on living tissue are outlined. 1.4. The biological effects of radiation are identified.
2. Apply radiation safety procedures/plans	2.1. Appropriate ionizing radiation protective measures are employed in accordance with relevant organisational policy and procedures.

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ELEMENT	PERFORMANCE CRITERIA
	2.2. SI units of radiation are explained as per the National Health and Medical Research Council/ statutory requirements. 2.3. Exposure limits for personnel as laid down by the radiation authorities in Australia are stated and adhered to. 2.4. Minimum exposure rates/distances are determined from calculations and charts. 2.5. Ionizing radiation sources are operated in accordance with legislation, standards and/or organisational policy, procedures or guidelines.
3. Select and use radiation monitoring equipment	3.1. The tools and equipment necessary to monitor radiation are selected and used as required. 3.2. Techniques and system verification checks necessary to monitor radiation are selected and applied. 3.3. Safety breaches are documented and/or reported in accordance with organisational policy and procedures.
4. Respond to emergency situations	4.1. Procedures for dealing with both X-ray and gamma ray emergency situations are demonstrated.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • calculating and numerical operations within the scope of this unit • reading and interpreting charts, written job instructions, specifications, standard operating procedures, lists, drawings and other applicable reference documents • planning and sequencing operations • checking and clarifying task-related operations • checking for conformance to specifications • using monitoring equipment • calculating and monitoring radiation

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REQUIRED SKILLS AND KNOWLEDGE

- handling emergencies
- following safety requirements
- assessing risk

Required knowledge

Look for evidence that confirms knowledge of:

- properties of X-rays and gamma rays and principal radioactive sources used in industrial radiography
- attenuation factors
- known biological effects of radiation
- general principles of gas ionisation, photographic effect, luminescence
- use of film, film badges, ionisation chamber devices, quartz fibre, fluorescent, electronic devices accuracy limits (energy/range)
- different SI units of radiation including becquerel, sievert and gray
- exposure limits for personnel as laid down by the radiation authorities in Australia
- the three exposure reduction factors including: time, distance and shielding
- procedures for establishing safe working barriers
- relevant techniques and checks
- emergency procedures
- safety procedures including for:
  - types of X-ray equipment
  - types of isotope cameras
  - shielding materials
  - design and requirements for exposure areas
  - requirements for storage of radioisotopes
- emergency situations, causes and appropriate responses
- hazards and control measures associated with ionizing radiation, including housekeeping
- storage requirements of equipment and materials
- use and application of personal protective equipment
- safe workplace practices and procedures
- legal requirements including;
  - Australian/NSW regulations, code of practice (detail)
  - ICRP recommended limits for various persons and various parts of the body for short-term, long-term and accumulated exposure
  - background radiation
  - duties of RSO
  - requirements for transport
  - IATA regulations

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REQUIRED SKILLS AND KNOWLEDGE
• obligations of the licensee

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to safely work with ionizing radiation when performing radiographic testing.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with radiographic testing or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate

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EVIDENCE GUIDE	
	must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Relevant organisational policy and procedures	• Legislation • Standard operating procedures (SOPs) • Australian or international standards • Risk assessments • Previous testing reports • Manufacturer specifications
Production of X-rays and gamma rays	• Atomic structure, protons, neutrons, electrons, atomic number, mass number, isotopes • Electromagnetic radiation wavelength, frequency, energy relationships, intensity • Construction and operation of X-ray tube anode, cathode, target • Gas and coolidge tubes • Glass and ceramic tubes • X-ray spectrum • Characteristic and continuous spectra effect of voltage and current on continuous spectra • Efficiency • Natural and artificial radioisotopes • Production of radioisotopes

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RANGE STATEMENT	
	• Decay mechanisms, alpha, beta-, beta+, and gamma • Concept of half life, decay constants • Selection of gamma ray sources • Units definition of curie, becquerel, conversion of units, multiple units (e.g. GBq), nuclide chart
Biological effects of radiation	• Ionisation, absorption, scatter (Compton, Rayleigh, photo-electric, pair production) • Attenuation coefficient, absorption edges • Units roentgen, rad, coulomb/kg, gray conversions • Effects of varying doses on living tissue • Somatic effects, genetic effects, cell biology nucleus, cytoplasm • DNA, chromosome, mitosis; symptoms, effect of time, ICRP recommendations • Dose, dose equivalent, RBE, rem, seivert, conversions • Occupancy factor
Protective measures	• Personal protective equipment (PPE) including for risks other than ionizing radiation • Safety protocols of workplace (e.g. flame limitations in refineries) • Signage, barriers/guards • Limitations on operation of specific equipment/machines
Minimum exposure	• Time, distance, shielding effect of distance, inverse square law • Half and tenth value layers • Emergency procedures, company procedure codes

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Occupational health and safety

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MEM13014A Apply principles of occupational health and safety in the work environment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers following occupational health and safety procedures in an engineering or similar work environment.

Application of the Unit

Application of the unit	This unit covers essential skills and knowledge that underpin all units within the Metal and Engineering Training Package. The unit applies to working in the engineering, manufacturing or similar industries. Competencies demonstrated would be associated with performance of duties and use of specialist skills. This unit and these standards do not cover the skills of emergency teams such as fire fighting, first aid officer etc. **Band**: **A** **Unit Weight**: There is no unit weighting for this unit.

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Follow safe work practices	1.1. Work is carried out safely and in accordance with company policy and procedures and legislative requirements. 1.2. Housekeeping is undertaken in accordance with company procedures. 1.3. Responsibilities and duties of employees are understood and demonstrated in day-to-day actions. 1.4. Personal protective equipment is worn and stored according to company procedures. 1.5. All safety equipment and devices are used according to legislative requirements and company/manufacturers' procedures. 1.6. Safety signs/symbols are identified and followed as per instruction. 1.7. All manual handling is carried out in accordance with

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ELEMENT	PERFORMANCE CRITERIA
	legal requirements, company procedures and National Occupational Health&Safety Commission guidelines. 1.8. Emergency equipment is identified and appropriate use is demonstrated.
2. Report workplace hazards and accidents	2.1. Actual and foreseeable workplace hazards are identified during course of work and reported to appropriate person according to standard operating procedures. 2.2. Accidents and incidents are reported according to workplace procedures
3. Follow emergency procedures	3.1. Appropriate personnel and emergency services and means of contacting them in the event of an incident can be identified. 3.2. Emergency and evacuation procedures are understood and carried out where required. 3.3. Company evacuation procedures are followed in case of an emergency.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • following safe working practices • maintaining a safe and clean condition workplace • carrying out workplace activities such as working safely, not endangering others, following company and legislative requirements, following procedures • selecting, wearing and storing appropriate personal protective equipment • using appropriate safety equipment and devices • carrying out work with the information given by safety signs and symbols • carrying out manual handling principles • using emergency equipment correctly • noting workplace hazards • contacting appropriate personnel and emergency services in the event of an accident

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REQUIRED SKILLS AND KNOWLEDGE
• following emergency and evacuation procedures • communicating and interpreting information appropriate to OH&S within the scope of this unit • checking and clarifying task-related information • communicating with emergency personnel • checking for conformance to specifications
Required knowledge
Look for evidence that confirms knowledge of: • rights, responsibilities and duties of employees and employers • use of personal protective equipment • appropriate equipment and safety devices for particular workplace tasks • reasons for using safety equipment and devices • meaning and application of safety signs and symbols • procedures and limits for manual handling • location and use of emergency equipment • reasons for selecting a particular type of equipment • procedures for identifying and reporting hazards • persons or services to be contacted in the event of a range of accidents • reasons for use of standard procedures • standard procedures including those for emergencies and evacuation • hazards and housekeeping requirements associated with the work environment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply principles of occupational health and safety in the work environment.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required

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EVIDENCE GUIDE	
	knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying principles of occupational health and safety in the work environment or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised

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RANGE STATEMENT	
wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Personal protective equipment	• Safety glasses • Face and head protection • Hard hats • Protective footwear • Protective clothing • Breathing apparatus • Ear protection • Gloves
Safety equipment and devices	• Safety harness • Screens, barriers and shielding • Extraction fans • Machine guards • Isolation devices

Safety signs/symbols	• Standard signage/symbols conforming to AS 1319-1994
	• Safety signs for the occupational environment, and any other applicable Australian Standards
	• Workplace-specific signage
	• Typical classes of relevant signs/symbols are:
	  • mandatory
	  • prohibition
	  • danger
	  • caution
	  • general safety
	  • safety information
	  • fire safety equipment

Manual handling	Posture, weight limits, bending, twisting

Hazards	For the purposes of this unit a hazard is defined as anything with the potential for injury or damage. Hazards may be:
	• physical:
	  • machinery
	  • hot metal
	  • electricity

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RANGE STATEMENT	

	• fire
	• poor housekeeping:
	  • spills
	  • trip hazards such as congestion, clutter, waste build-up
	  • cleanliness
	• noise and vibration
	• extremes of temperature and humidity
	• condition/design of equipment
	• individual (behavioural):
	  • skylarking and foolishness
	  • substance abuse
	  • failure to follow procedures
	  • lack of training or experience
	  • carelessness
	  • poor personal health/hygiene
	  • using the wrong techniques/procedures
	  • ignoring safety rules and signs
	  • taking short cuts
	  • knowingly using unsafe equipment
	• environmental hazards:
	  • explosive materials
	  • flammable materials
	  • poor ventilation
	  • poor lighting
	  • dust
	  • fumes
	  • vapours
	  • gases
	  • liquids
	  • mineral fibres
	  • chemical spills
	  • pollutants
	  • other toxic or dangerous materials

Accidents and incidents	For the purposes of this unit an accident is defined as 'an unplanned and unexpected event which interrupts the normal course of activity. It may or may not result in damage or injury'. This definition

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RANGE STATEMENT	
	includes near misses. An incident is defined here as any other unexpected or extraordinary event not classed as an accident. Examples include: • burns • poisoning • broken limbs • eye accidents • other injuries • spills • explosions • falls • electrical accidents • breakdowns • damage to equipment or materials/product • incidents involving physical, individual or environmental hazards
Appropriate personnel	• Safety representative • Occupational health and safety officer • OHS committee member • First aid officer • Supervisor • Union representative
Emergency and evacuation procedures	Documented workplace emergency procedures

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units	

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Co-requisite units		

Competency field

Competency field	Occupational health and safety

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MEM14001B Schedule material deliveries

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers identifying material requirements and scheduling material delivery.

Application of the Unit

Application of the unit	This unit applies to the estimating, planning and scheduling of material deliveries so that materials are available in quantities and specifications required. This unit is not intended to be used by personnel carrying out maintenance and installation. If scheduling is based on engineering drawings and supporting engineering data, appropriate skill units should be accessed. **Band**: **B** **Unit Weight**: **8**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify material requirements	1.1. Materials required are identified from appropriate documentation including type and quality. 1.2. Quantities required are estimated in accordance with standard operating procedures.
2. Schedule material delivery	2.1. Delivery requirements and dates are determined from production plans or job sequencing requirements. 2.2. Material supply is followed up and problems reported. 2.3. Material orders are processed in accordance with established organisational practice and procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • communicating • planning • assessing • reading and interpreting engineering specifications • organising information • prioritising • entering routine and familiar information onto proformas and standard workplace forms
Required knowledge
Look for evidence that confirms knowledge of: • identification of material specifications from appropriate documentation • established organisational practice and procedures relating to estimating, ordering and follow up of materials • interpretation of production plans, or job sequencing requirements • safe workplace practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to plan and schedule material deliveries.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for	This unit may be assessed on the job, off the job or a

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EVIDENCE GUIDE	
assessment	combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the planning and scheduling of material deliveries or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Appropriate documentation	Bills of materials, parts lists, catalogues, service manuals, engineering drawings etc.
Schedule	Undertaken in accordance with established organisational practices and procedures, based on familiar processes

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Planning

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MEM14002B Undertake basic process planning

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers reviewing process specifications and determining the production sequence.

Application of the Unit

Application of the unit	This unit applies to one of a range of processes in manufacturing: machining, pressing, assembly and to a stage of the overall production process. It does not apply to interfacing between processes. If planning is based on engineering drawings and supporting engineering data, appropriate skills units should be accessed. **Band**: **B** **Unit Weight**: **8**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Review process specifications	1.1. Supporting engineering and production data is examined, where required. 1.2. The production processes to be used are determined. 1.3. Specifications are obtained and examined.
2. Determine production sequence	2.1. Steps required for the process are identified and flow charts are produced where required in accordance with standard operating procedures. 2.2. Material and parts lists are prepared in accordance with standard operating procedures. 2.3. Tooling and/or equipment requirements are documented in accordance with standard operating procedures. 2.4. Quality assurance steps and specifications are identified and incorporated into process steps. 2.5. Process steps are documented and clearly represented in accordance with standard operating procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • obtaining, reading and interpreting engineering and production data • preparing flow charts • communicating • planning • assessing • reading and interpreting engineering specifications • organising information • prioritising
Required knowledge
Look for evidence that confirms knowledge of: • production processes found within the organisation • tooling and/or equipment requirements for workplace processes • quality assurance requirements • safe workplace practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to undertake basic process planning.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required

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EVIDENCE GUIDE	
	knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with basic process planning or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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RANGE STATEMENT	
situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Production processes	Work planned over a specified timeframe, taking into account required and available resources
Steps	Steps and milestones against which progress can be checked

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Planning

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MEM14003B Undertake basic production scheduling

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers identifying production requirements and capacities and preparing schedules for production of a component/part.

Application of the Unit

Application of the unit	The unit applies to the scheduling of the manufacture of a single component, or a single assembly function, or for a single small production work unit or production cell, or a single production process where there are only a small number of constraints or variables. **Band**: **B** **Unit Weight**: **8**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify production requirements and capacities	1.1. Engineering production data is identified and obtained in accordance with workplace procedures. 1.2. Inventory capacities and requirements are identified and obtained in accordance with workplace procedures. 1.3. Procurement and supply requirements and constraints are identified and obtained in accordance with workplace procedures. 1.4. Production capacity and constraints are identified and obtained in accordance with workplace procedures. 1.5. Standard times are identified and obtained in accordance with workplace procedures.
2. Prepare schedule for production of a component/part	2.1. Production of component is scheduled in accordance with production, inventory, procurements, time constraints, supply capacities and requirements. 2.2. Schedule is documented in accordance with accepted organisation procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • obtaining, reading and interpreting production process data and procedure • prioritising • communicating • time management • organising • documenting • using project management tools such as Gantt Charts • analysing • performing arithmetic calculations
Required knowledge
Look for evidence that confirms knowledge of: • scheduling techniques • production methods • quality assurance requirements • inventory policies • procurement, supply requirements and constraints • general staffing levels, capabilities and application of standard times • machine set-up, capability and application of standard times • enterprise safety requirements and directives

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to schedule basic production.

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with basic scheduling or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different

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RANGE STATEMENT	
work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Planning

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MEM14004A Plan to undertake a routine task

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers a person planning their own work where tasks involve one or more steps or functions and are carried out routinely on a regular basis. It includes the concepts of following routine instructions, specifications and requirements.

Application of the Unit

Application of the unit	This unit covers essential skill and knowledge that underpin all units within the Metal and Engineering Training Package. Instructions, such as standard operation sheets, are provided. Clear specifications and requirements, including quality and time allowances are also provided. The task and associated planning activity are carried out under supervision. The plan may or may not be documented. The task involves one or more steps or functions carried out routinely on a regular basis. The planning activity does not require judgment to be made in relation to priorities or time limitations. **Band**: **A** **Unit Weight**: There is no unit weighting for this unit.

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify task requirements	1.1. Instructions and procedures are obtained, understood and where necessary clarified. 1.2. Relevant specifications for task outcomes are obtained, understood and where necessary clarified. 1.3. Task outcomes are identified. 1.4. Task requirements such as completion time and quality measures are identified.
2. Plan steps required to complete task	2.1. Based on instructions and specifications provided, the individual steps or activities required to undertake the task are understood and where necessary clarified. 2.2. Sequence of activities is identified.

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Plan is checked to ensure it complies with specifications and task requirements.
3. Review plan	3.1. Effectiveness of plan is reviewed against specifications and task requirements. 3.2. If necessary, plan is revised to better meet specifications and task requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • obtaining instructions for tasks from correct source of information (job card, supervisor, work colleagues and others) • clarifying tasks and required outcomes with appropriate personnel where necessary • identifying relevant specifications from documentation, job cards, or other information source • preparing plans for tasks • sequencing activities • comparing planned steps against specifications and task requirements • communicating and interpreting information appropriate to the scope of this unit
Required knowledge
Look for evidence that confirms knowledge of: • correct sources of information for a particular task • procedures for obtaining instructions and clarification • specifications for the task • hazards and established control measures associated with the routine task, including housekeeping • safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to plan to undertake a routine task.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with planning to undertake a routine task or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Specifications	• Specific product or process information, such as:
	  • outcome and performance requirements
	  • quality requirements and checks
	  • quantity
	• Specifications are conveyed verbally or on familiar standard forms, such as on job sheets

Requirements	• General requirements necessary to carry out routine tasks, such as:
	  • dedicated tools and equipment
	  • materials and parts
	  • work procedures
	  • completion time
	  • safety measures and equipment
	• Requirements and instructions are supplied verbally or on familiar standard forms, such as on job sheets. Instructions are carried out under supervision and in accordance with established procedures

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Planning

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MEM14005A Plan a complete activity

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers planning activities which, whilst following established procedures, may require a response and modification of procedures or choice of different procedures to deal with unforeseen developments.

Application of the Unit

Application of the unit	The unit covers the development of plans for individual complete activities and may include the use of planning techniques and tools. The activity may require prioritising of the individual plan components to facilitate the meeting of the objectives. Examples of activities to be planned may include: fault diagnosis and repair of an item of equipment, a modification of an established sequence of assembly tasks. However the activities may require a response and modification of procedures or a choice of different procedures to deal with unforeseen developments. Activities are normally performed by the individual undertaking the planned activity, and associated reports are completed as required. Planning will be related to familiar work tasks and environments and be performed to standard operating procedures. Where more extensive reporting requiring research and forming conclusions is required, refer to Unit 16.14 (Report technical information). **Band**: **A** **Unit Weight**: **4**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify activity requirements	1.1. Activity outcomes and objectives are identified and clarified with appropriate persons. 1.2. Activity requirements, including resources, overall timeframe, quality requirements and criteria for acceptable completion are identified and clarified. 1.3. Relevant specifications and procedures are obtained

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ELEMENT	PERFORMANCE CRITERIA
	and clarified.
2. Plan process to complete activity	2.1. The individual components of the activity are identified and prioritised. 2.2. Planning tools and techniques are selected and used according to the needs of the activity. 2.3. The plan is checked for accuracy and conformance to instructions and requirements.
3. Modify plan	3.1. The plan is referred to and modified as necessary to overcome unforeseen difficulties or developments that occur as work progresses. 3.2. The results of the activity are reviewed against the plan, and possible future improvements to plan are identified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- obtaining, reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawing and other applicable reference documents
- preparing a plan including sequential steps that will enable the activity to be completed
- modifying the plan where appropriate, to take account of difficulties or developments that occur while following the prepared plan
- planning and sequencing activities
- checking and clarifying task-related information
- checking for conformance to specifications
- using numerical operations, geometry and calculations/formulae within the scope of this unit
- using planning techniques such as scheduling, time management, brainstorming, setting of goals and defined outcomes, prioritising, review and evaluation strategies

Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE
Look for evidence that confirms knowledge of: • tasks to be performed • person/s who can clarify the objectives, requirements and specifications • specifications relevant to the tasks to be performed • outcomes to be achieved • timeframe for activity completion • quality requirements of the product or service • priority of each step in the plan • reasons for the relative priority of each step • modifications to the plan to overcome a range of unforeseen situations • hazards and control measures associated with planning the complete activity, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to plan a complete activity.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

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EVIDENCE GUIDE	
	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with planning a complete activity or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Requirements	• Formal or informal information about the task required, such as:
	  • timeframe
	  • quality requirements
	  • outcome and performance requirements
	  • job history
	  • checks and tests

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RANGE STATEMENT	
	• special reporting requirements • tools and equipment • materials and parts • reference documents • Requirements and instructions are supplied verbally or in written form such as on job sheets. Instructions are carried out in accordance with established procedures
Specifications	Technical task related information conveyed verbally or as found in: • task lists • instructions • manufacturer manuals • diagrams and schematics • technical drawings and sketches • parts lists • computer records
Planning techniques and tools	Scheduling, time management, brainstorming, setting goals and defined outcomes, prioritising, review and evaluation strategies

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Planning

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MEM14085A Apply mechanical engineering analysis techniques

Modification History

Release 1 - New unit Replaces MEM14061A, but not equivalent.

Unit Descriptor

This unit of competency covers the skills needed to undertake a range of mechanical engineering-related analyses. The analyses may relate to design, fitness for purpose evaluations, installation and commissioning, and other mechanical engineering-related tasks. Documentation of the design process includes calculations, specifications, computer-aided design (CAD) files, risk analysis, sustainability and life cycle assessments.

Application of the Unit

This unit applies to mechanical engineering analyses undertaken as part of a mechanical design or mechanical assessment of plant, products, projects, system changes or improvements. It is suitable for people working as mechanical designers and draftspersons and those pursuing careers and qualifications in mechanical engineering or related disciplines. The work may be undertaken individually or as part of a team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23109A	Apply engineering mechanic principles

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential Performance criteria describe the performance needed

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outcomes of a unit of competency. to demonstrate achievement of the element.

Elements and Performance Criteria

1	Investigate mechanical analysis context and need	1.1	Review the context and negotiate parameters of the mechanical design or task in consultation with stakeholders
		1.2	Identify relevant engineering scientific principles and required analysis techniques
		1.3	Investigate life cycle design and sustainability implications of mechanical design or existing plant or equipment
		1.4	Determine specification, documentation and graphical techniques required for analysis
		1.5	Confirm work health and safety (WHS) and regulatory requirements, codes of practice, standards, and risk management relevant to mechanical analysis task
		1.6	Determine available sources for any required technical and professional assistance
2	Apply mechanical analysis techniques	2.1	Plan, schedule and coordinate the analysis task
		2.2	Create adequate and accurate calculations, preliminary graphics and maintain analysis process records
		2.3	Evaluate multiple solutions against analysis criteria
		2.4	Apply systems thinking to problem solving and decision making
		2.5	Incorporate professional and technical assistance, as required
		2.6	Apply specification, documentation and graphical techniques modelling, mock-up or prototyping techniques, where required, to achieve or test solution

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3	Report results	3.1	Record results of analysis
		3.2	Provide documentation, such as calculations, specifications, diagrams, CAD files, mock-ups or prototypes

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating and negotiating with stakeholders and team
- determining or confirming relevance of mechanical engineering scientific principles and analysis techniques, including principles of:
  - mechanics
  - fluid power
  - fluid dynamics
  - thermodynamics
  - electrical fundamentals
  - engineering materials, properties and processes
- evaluating WHS and regulatory requirements, standards and codes of practice for relevance to analysis tasks
- evaluating multiple solutions against analysis criteria, risk, sustainability and cost factors
- applying life cycle design and sustainability parameters to analysis task
- planning, scheduling and coordinating the analysis task
- applying problem solving and decision making with systems thinking for contingencies and constraints and continuous improvement
- specifying, documenting and applying graphical techniques, including modelling
- undertaking or supervising mock-up or prototyping techniques, where required, to achieve solution
- creating and maintaining adequate and accurate calculations and analysis process records
- reporting and documenting results of investigations, application of principles and techniques, calculations, specifications, diagrams, CAD files, mock-ups or prototypes of designs

Required knowledge

Required knowledge includes:

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- implications of life cycle design, fitness for purpose evaluation and sustainability for mechanical analysis process
- mechanical engineering-related analysis processes and techniques to investigate, synthesise and develop proposals, evaluate feasibility against analysis criteria, and review and revise in consultation with stakeholders and team or support functional group
- common model, mock-up and prototyping techniques relevant to mechanical engineering
- systems thinking, problem solving and decision making, and continuous improvement methods
- WHS and regulatory requirements, codes of practice, standards, risk management and registration requirements
- sources of professional and technical assistance
- procedures for planning, scheduling and coordination of analysis
- hardware requirements of typical mechanical, fluid power, hydrodynamic and thermal applications
- engineering scientific principles required for design analysis:
  - mechanical
  - fluid power
  - fluid dynamics
  - thermodynamics
  - electrical fundamentals
  - engineering materials, properties and processes
- mechanical analysis calculation techniques
- software for product planning and analysis, such as CAD, stress analysis and mould design, and project management
- documentation and required information
- prototyping options, including mock-ups, physical and virtual modelling, and rapid prototyping

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to apply mechanical analysis techniques consistent with an analysis brief information, relevant standards and conventions.
Critical aspects for assessment and evidence required to demonstrate	Assessors must be satisfied that the candidate can competently and consistently: • communicate, negotiate and review analysis brief and

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competency in this unit	specification requirements with stakeholders • determine or confirm relevant scientific principles and analysis techniques, WHS and regulatory requirements • evaluate multiple solutions • investigate life cycle analysis and sustainability • plan, schedule and coordinate the analysis task • solve problems and make decisions with systems thinking for contingencies and constraints and continuous improvement • define analysis, specify and document and apply graphical techniques, modelling, mock-up or prototyping techniques • create and maintain adequate and accurate calculations and analysis process records • report and document, results and processes.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information	Assessment processes and techniques must be culturally

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for assessment	appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Mechanical engineering analysis	Mechanical engineering analysis may be required for a variety of reasons, including: • design of mechanical devices and plant • design or evaluation of significant modifications, process changes or improvements • sustainability issues relevant to plant, equipment or processes • static and dynamic analysis of loads, including the resulting stresses and deformations • fitness for purpose evaluation • installation and commissioning of plant and equipment
Planning processes	Planning processes may include: • establishing analysis parameters and criteria • contributing to the negotiation and advice process • preliminary planning, analysis investigations and costing • identifying analysis, development, prototyping activities and skills requirements • planning and scheduling analysis activities • improving, adjusting and rescheduling as required by emergency contingencies and constraints
Analysis process	Analysis as a systematic process includes: • establish analysis parameters and criteria • research, measurement, experimentation, and investigation • generating ideas • synthesis, problem solving and decision making, and addressing constraints • apply scientific principles, calculation and graphics, prototyping and mock-up techniques • evaluating solutions against analysis criteria • consultation, adjustments and agreement

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	• finalise analysis and sign-off
Analysis criteria	Analysis includes relevant technical criteria and may also include criteria relating to: • function • manufacturability and maintainability • marketability • sustainability • cost constraints • ergonomics and anthropometrics and physiology • facilities, plant and skills available • contingencies and constraints minimisation • safety and risk
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer
Life cycle analysis	Life cycle analysis can be used to improve sustainability of products and services. It may be applied to: • all aspects of manufacture of a single product • the entire operations of an organisation • a particular aspect of operations, such as environmental implications
Prototyping	Prototyping may include: • mock-ups • physical and virtual modelling with post-processing for computer numeric control (CNC) and rapid prototyping
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect outcomes. Systems should

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	be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain

Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic danger, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to the mechanical engineering analysis task

Unit Sector(s)

Competency field

Unit sector Planning

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Custom Content Section

Not applicable.

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MEM14086A Apply mechatronic engineering analysis techniques

Modification History

Release 1 - New unit. Replaces MEM14062A, but not equivalent.

Unit Descriptor

This unit of competency covers the skills needed to undertake a range of mechatronic analyses. The analyses may relate to design or contribution to the design of mechatronic devices or automated plant or be for other purposes, including fitness for purpose evaluations, installation and commissioning, system changes or improvements or other mechatronic engineering-related tasks. It includes application of mechanical, fluid, electrical and controller design and analytical techniques.

Application of the Unit

This unit applies to mechatronic analyses undertaken as part of a mechatronic engineering design or assessment of automated plant or devices for projects, system changes or improvements.

It is suitable for people working as mechatronic or automated system designers and draftspersons and those pursuing careers and qualifications in mechatronic, automation, maintenance or manufacturing engineering. The work may be undertaken individually or as part of a team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23111A	Select electrical equipment and components for engineering applications
MEM23112A	Investigate electrical and electronic controllers in engineering applications
MEM14090A	Integrate mechatronic fundamentals into an engineering task

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Investigate mechatronic analysis context and need	1.1	Review the context and negotiate parameters of the engineering design brief in consultation with stakeholders
		1.2	Identify relevant engineering scientific principles and required analysis techniques
		1.3	Investigate life cycle design and sustainability implications of mechatronic design or existing mechatronic systems, devices or equipment
		1.4	Determine specification, documentation and graphical techniques required for analysis
		1.5	Confirm work health and safety (WHS), regulatory requirements, codes of practice, standards, and risk management relevant to mechatronic analysis task
		1.6	Determine available sources for any required technical and professional assistance
2	Apply mechatronic analysis techniques	2.1	Plan, schedule and coordinate the analysis task
		2.2	Create adequate and accurate calculations, preliminary graphics and maintain design process records
		2.3	Evaluate multiple solutions against analysis criteria
		2.4	Integrate mechatronic techniques, hardware and software, including mechanical, fluid, electrical, electronic, controller and networking

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		2.5	Apply systems thinking, problem solving and decision making
		2.6	Incorporate professional and technical assistance, as required
		2.7	Apply specification, documentation and graphical techniques modelling, mock-up or prototyping techniques, where required, to achieve or test solution
3	Report results	3.1	Record results of analysis
		3.2	Provide documentation such as calculations, specifications, diagrams, computer-aided design (CAD) files, control circuits and controller programs, mock-ups or prototypes

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating and negotiating with stakeholders and team
- determining or confirming relevance of mechatronic scientific principles and analysis techniques, including principles of:
  - mechanical
  - fluid power
  - fluid dynamics
  - thermodynamics
  - electrical and electronic fundamentals
  - controller and system control and data acquisition (SCADA) or distributed control systems (DCS) programming
  - engineering materials, properties and processes
  - techniques for integration of mechanical, fluid, electrical, electronic, controller and networking elements
- evaluating relevance of WHS, and regulatory requirements, standards and codes of practice
- evaluating multiple solutions against design criteria, risk, sustainability and cost factors

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- applying life cycle design and sustainability parameters to analysis task
- planning, scheduling and coordinating the mechatronic analysis task
- solving problems and making decisions with systems thinking approach for contingencies and constraints, and continuous improvement
- integration of hardware and software and mechatronic techniques, such as mechanical, fluid, electrical, electronic, controller and networking
- specifying, documenting and applying graphical techniques, including modelling
- undertaking or supervising mock-up or prototyping techniques, where required, to achieve solution
- creating and maintaining adequate and accurate calculations and analysis process records
- reporting and documenting, results of investigations, application of principles and techniques, calculations, specifications, diagrams, CAD files, mock-ups or prototypes of designs

Required knowledge

Required knowledge includes:

- implications of life cycle design, fitness for purpose evaluation and sustainability for mechatronic analysis process
- mechatronic analysis processes and techniques to investigate, synthesise and develop proposals, evaluate feasibility against design criteria, and review and revise in consultation with stakeholders, team or support functional group
- common model, mock-up and prototyping techniques relevant to mechatronic engineering
- systems thinking, problem solving and decision making, and continuous improvement methods
- WHS and regulatory requirements, codes of practice, standards, risk management and registration requirements with particular emphasis on automation safety requirements
- sources of professional and technical assistance
- procedures for planning, scheduling and coordination of analysis
- hardware requirements of typical mechatronic or automation applications
- engineering mechatronic scientific principles and techniques required for analysis tasks:
  - mechanical
  - fluid power
  - fluid dynamics
  - thermodynamics
  - electrical and electronic fundamentals
  - controller and SCADA or DCS programming
  - engineering materials, properties and processes
  - techniques for integration of mechanical, fluid, electrical, electronic, controller and networking elements
- mechatronic analysis calculations techniques
- software for product planning and design, such as CAD, circuit design, controller

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programming and project management
- required documentation prototyping options, including mock-ups, physical and virtual modelling and rapid prototyping

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to apply mechatronic design techniques consistent with a design brief information, relevant standards and conventions.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • communicate, negotiate and review design brief with stakeholders and team or support functional group • determine or confirm relevant scientific principles and analysis techniques, WHS and regulatory requirements • evaluate multiple solutions • investigate life cycle design and sustainability • plan, schedule and coordinate the design task • integrate mechatronic techniques, hardware and software • solve problems and make decisions with systems thinking for contingencies and constraints, and continuous improvement • define analysis, specify and document and apply graphical techniques, modelling, mock-up or prototyping techniques • create and maintain adequate and accurate calculations and design process records • report and document results and processes.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical

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	resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Mechatronic engineering analysis	Mechatronic engineering analysis may be required for a variety of reasons, including: • design of automated devices and plant • design or evaluation of significant modifications, process changes or improvements • sustainability issues relevant to plant, equipment or processes • fitness for purpose evaluation • installation and commissioning of plant and equipment
Planning processes	Planning processes may include: • establishing design parameters and design criteria

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	• contributing to the negotiation and advice process • preliminary planning, design investigations and costing • identifying design, development, prototyping activities and skills requirements • planning and scheduling design activities • improving, adjusting and rescheduling as required by emergency contingencies and constraints
Analysis process	Designing as a systematic process includes: • establish design parameters and criteria • research, measurement, experimentation and investigation • generating ideas • synthesis, problem solving and decision making, and addressing constraints • apply scientific principles, calculation and graphics, prototyping and mock-up techniques • evaluating solutions against design criteria • consultation, adjustments and agreement • finalise design and sign-off
Analysis criteria	Analysis includes relevant technical criteria and may also include criteria relating to: • function • aesthetics • manufacturability and maintainability • marketability • sustainability • cost constraints • ergonomics and anthropometrics and physiology • manufacturability, maintainability • facilities, plant and skills available • safety and risk
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer

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Life cycle assessment	Life cycle analysis can be used to improve sustainability of products and services. It may be applied to: • all aspects of manufacture of a single product • the entire operations of an organisation • a particular aspect of operations, such as environmental implications
Prototyping	Prototyping may include: • mock-ups, physical and virtual modelling with post-processing for computer numeric control (CNC) and rapid prototyping

Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular mechatronic analysis task
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or

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	support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain
Automation safety	Automation safetyrefers to the reliance on emergency stop, failsafe design, redundancy, interlocks and data integrity. Standards apply to general plant design and use as well as the 'functional safety of safety-related electrical, electronic and programmable electronic control systems'
Mechatronic hardware	Mechatronic hardware may include: • mechanical, fluid and electric actuators • power transmission devices • pipes, conduits wires, fittings and connectors • controllers • power interfaces • signal conditioning interfaces
Documentation	Documentation includes: • documented calculations • specifications • CAD files • risk analysis • sustainability and life cycle assessments

Unit Sector(s)

Competency field

Unit sector Planning

Custom Content Section

Not applicable.

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MEM14087A Apply manufactured product design techniques

Modification History

Release 1 - New unit. Replaces MEM14063A, but not equivalent.

Unit Descriptor

This unit of competency covers the application of engineering design techniques to manufactured products. It includes documentation of the design process, calculations, specifications, computer-aided design (CAD) files, risk analysis, sustainability and life cycle assessments.

Application of the Unit

This unit applies to where engineering and related skills and knowledge are required for the design of manufactured products or components. The unit applies to people working individually or as part of a team. It is suitable for individuals working alone as designers on simpler manufactured product and component design or as part of a design team consisting of other paraprofessional and professional engineering designers. The unit is also suitable for design draftspersons undertaking design tasks.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM14089A Integrate mechanical fundamentals into an engineering task

MEM23004A Apply technical mathematics

MEM23063A Select and test mechanical engineering materials

MEM23109A Apply engineering mechanic principles

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Investigate manufactured product design requirements	1.1	Review product design brief
		1.2	Determine engineering and scientific principles and design techniques required for product design process
		1.3	Investigate life cycle design and sustainability implications of design requirement
		1.4	Determine required specification, documentation and graphical techniques to define design
		1.5	Confirm work health and safety (WHS) and other regulatory requirements
		1.6	Identify codes, standards and risk management requirements
		1.7	Investigate software requirements for product design process
2	Apply manufactured product design techniques	2.1	Plan, schedule and coordinate the design task
		2.2	Analyse available materials, components, manufacturing processes, tooling and suppliers against design requirements
		2.3	Create adequate and accurate calculations, preliminary graphics and maintain design process records
		2.4	Evaluate multiple solutions against design criteria, risk, failure mode, sustainability and cost
		2.5	Apply systems thinking, problem solving and decision making techniques in dealing with contingencies and constraints, continuous improvement and development of design options

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		2.6	Incorporate professional and technical assistance, as required
		2.7	Finalise specification and documentation, modelling, mock-up or prototyping
3	Report results	3.1	Record results of investigations, application and development of design
		3.2	Provide documentation, such as calculations, specifications, diagrams, CAD files, mock-ups or prototypes

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating and negotiating with stakeholders
- determining or confirming appropriate engineering and scientific principles for product or component design task
- determining sustainability, WHS, regulatory and risk management requirements
- evaluating multiple solutions for materials and components, manufacturing processes, tooling and component supply for product
- investigating life cycle and sustainability of a design
- evaluating requirement for technical and professional assistance
- planning, scheduling and coordinating a design task
- solving problems and making decisions with systems thinking for contingencies and constraints, and continuous improvement
- specifying and documenting designs, including applying graphical techniques, modelling, mock-up or prototyping techniques
- creating and maintaining adequate and accurate calculations and design process records
- reporting and documenting results of investigations, application of principles and techniques, calculations, specifications, diagrams, CAD files, mock-ups or prototypes of designs

Required knowledge

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Required knowledge includes:

- sustainability implications of materials, product and processes, including consideration of life cycle analysis
- manufactured product design processes and techniques
- systems thinking, problem solving and decision making, and continuous improvement methods
- WHS and regulatory requirements, standards and risk assessment for design, and prototyping activities
- sources of professional and technical assistance procedures for planning, scheduling and coordination of design
- typical product design criteria
- design calculation techniques
- product planning and design software, such as for CAD, stress analysis and project management
- design process documentation, records and reports, including specifications and CAD graphics
- typical materials and components used in manufacturing
- tooling, plant and processes for particular products and materials
- characteristics of cast, forged, machined and sheet metal components, moulded and extruded plastic components, and components made from other materials or by other processes
- professional and technical assistance for product development

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to apply manufactured product design techniques consistent with a design brief, relevant standards and conventions. It includes working individually and as part of a team in accordance with organisational procedures.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • communicate, negotiate and review design brief with stakeholders • determine or confirm scientific principles and design techniques, WHS and regulatory requirements, and design specification requirements • evaluate multiple solutions, materials and components,

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	manufacturing processes, tooling and component supply chain for product • investigate life cycle design and sustainability, technical and professional assistance required • plan, schedule and coordinate the design task • select design components using design process and scientific principles • solve problems and make decisions with systems thinking for contingencies and constraints and continuous improvement • define designs, specify and document and apply graphical techniques, modelling, mock-up or prototyping techniques • create and maintain adequate and accurate calculations and design process records • report and document results and processes.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.

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Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Context of manufactured product design	The context for product design activity may include: • budget and market considerations • technological advantages/disadvantages of materials, equipment and suppliers • resources supply (e.g. materials, labour and skills) • sustainability issues relevant to design task (e.g. WHS, risk management, standards and codes of practice)
Planning processes	Planning processes may include: • establishing design parameters and design criteria • contributing to the negotiation and advice process • preliminary planning, design investigations and costing • identifying design, development, prototyping activities and skills requirements • planning and scheduling design activities • improving, adjusting and rescheduling as required by emergency contingencies and constraints
Design process	Designing as a systematic process includes: • establish design parameters and criteria • research, measurement, experimentation and investigation • generate ideas and develop proposals • synthesis, problem solving and decision making, and addressing constraints • apply scientific principles, calculation and graphics, prototyping and mock-up techniques • evaluate solutions against design criteria • review and revision of design in consultation with stakeholders • finalise design and sign-off

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Design criteria	Design criteria include: • function • aesthetics • manufacturability and maintainability • marketability • sustainability, including life cycle analysis • cost constraints on costs of design, development, tooling up, manufacture, marketing and distribution • ergonomics and anthropometrics and physiology • facilities, plant and skills available • safety and risk
Analysis	Analysis may include: • product and component performance requirements • assessment against manufacturing capability of organisation • failure mode effects and risk • static and dynamic analysis of loads • the stresses and deformations resulting • graphical and mathematical methods and software options • suitability of materials for purpose and manufacturing process
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer
Life cycle assessment	Life cycle analysis can be used to improve sustainability of products and services. It may be applied to: • all aspects of manufacture of a single product • the entire operations of an organisation • a particular aspect of operations, such as environmental implications
Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include: • technical support and advice relating to elements which have intrinsic dangers, such as:

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	• high pressure • energised fluid vessels • high temperatures and heat energy capacity • wiring with high current control voltages above extra low voltage • professional support for technologies, such as: • specialist electric motor drives and controllers • specialist materials, plastics, metal alloys and nano materials • special processes, foundry, alloy welding, heat treatment, sealing and fastening
WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • industry codes of practice • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to the design task
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain
Product manufacturability	Design for manufacture includes consideration of manufacturing processes and plant, such as the use of group technologies. Manufacturability may be enhanced by concurrent product and process design.
Prototyping	Prototyping may include: • mock-ups, physical and virtual modelling with post-processing for computer numeric control (CNC) and rapid prototyping

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Unit Sector(s)

Competency field

Unit sector Planning

Custom Content Section

Not applicable.

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MEM14088A Apply maintenance engineering techniques to equipment and component repairs and modifications

Modification History

Release 1 (MEM05v9).

Unit Descriptor

This unit of competency covers the skills needed to apply maintenance engineering techniques to equipment or component modification or repair. It includes decision making on the need for repair, replacement or modification and design of any repair or modification. The unit covers maintenance techniques for repair and modification of mechanical, fluid and electrical plant, and facilities in accordance with procedures, work health and safety (WHS) and legislative requirements, and risk management procedures. Documentation of the repair or modification process includes calculations, specifications, computer-aided design (CAD) files, risk analysis, sustainability and life cycle assessments.

Application of the Unit

This unit applies to maintenance-related work where a technical evaluation must occur on whether to repair, replace or modify equipment or components and where engineering design techniques are applied where repair or modification is required. The unit applies across all engineering disciplines and would normally be selected in conjunction with appropriate technical units for the equipment or components being considered for maintenance.

The unit includes reviewing condition analysis and non-destructive test (NDT) reports. However, the conduct of condition analysis and NDT tests is covered by the relevant specialist technical units.

Where an organisation or whole of plant maintenance management systems is being reviewed or considered for change the unit MEM23125A Evaluate maintenance systems, should be selected.

The unit is suitable for people working at a technician level in maintenance-related design drafting or in maintenance-related supervision or management.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

MEM14092A Integrate maintenance fundamentals into an engineering task

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Investigate requirements of equipment or component maintenance task	1.1	Review the context and parameters of the maintenance task in consultation with stakeholders
		1.2	Review equipment or component original design and any subsequent modifications and repairs
		1.3	Review current performance specifications
		1.4	Determine engineering scientific principles and design techniques required for equipment or component maintenance
2	Investigate alternatives of repair, replacement or modification	2.1	Review preventative maintenance system requirements or defect/failure details to determine if replacement is required
		2.2	Review equipment or component condition analysis reports, including the results of any required NDT
		2.3	Review maintenance repair techniques and processes, standard parts, labour and skill requirements
		2.4	Consider life cycle design and sustainability implications of maintenance design and maintenance

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			activities
		2.5	Determine specification, documentation and graphical techniques required to define designs
		2.6	Confirm WHS and regulatory requirements, codes of practice, standards, risk management and registration requirements relevant to repair and modification design projects
		2.7	Assess the need for technical and professional assistance
		2.8	Consider software options for repair and modification design, such as computer-aided design (CAD), stress analysis and project management software
		2.9	Decide if repair, replacement or modification is appropriate and seek any necessary approvals
3	Apply repair and modification design techniques	3.1	Plan, schedule and coordinate the repair or modification design task
		3.2	Apply the design process and scientific principles to repair and modification design proposals
		3.3	Determine materials, components, maintenance processes, equipment and tools required to implement design
		3.4	Create adequate and accurate calculations, preliminary graphics and maintain design process records, including use of software, as appropriate
		3.5	Assess repair and modification designs against design criteria
		3.6	Apply systems thinking to problem solving and decision making techniques in dealing with contingencies and constraints for continuous improvement and development of design options
		3.7	Incorporate professional and technical assistance, as required
		3.8	Use specification, documentation and graphical techniques, modelling, mock-up or prototyping techniques, as appropriate, to define repair or modification

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4	Report results	4.1	Record results of investigations, application and development of repair and modification design
		4.2	Provide appropriate documentation, such as calculations, specifications, diagrams, CAD files, mock-ups or prototypes

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- determining or confirming scientific principles and maintenance design techniques, WHS and regulatory requirements, and design specification requirements required to meet maintenance brief
- evaluating multiple solutions, materials and components, maintenance repair processes and techniques, standard parts, skill requirements, equipment and tools
- investigating life cycle design and sustainability, technical and professional assistance alternatives for repair, replacement or improvement, and software options for maintenance planning and design
- planning, scheduling and coordinating the maintenance task
- applying design process and scientific principles to component and hardware selection and design proposals
- solving problems and making decisions with systems thinking for contingencies and constraints, and continuous improvement
- defining designs, specifying and documenting and applying graphical techniques, modelling, mock-up or prototyping techniques
- creating and maintaining adequate and accurate calculations and design process records
- reporting and documenting results of investigations, application of principles and techniques, calculations, specifications, diagrams, CAD files, mock-ups or prototypes of designs

Required knowledge

Required knowledge includes:

- sustainability implications of maintenance processes, materials and products, including consideration of life cycle analysis
- design processes and techniques

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- concurrent engineering techniques, systems thinking, problem solving and decision making, and continuous improvement methods
- WHS Acts and regulations, codes of practice, standards, registration and risk assessment for design, maintenance and prototyping activities
- procedures for planning, scheduling and coordination of maintenance design
- typical maintenance criteria, such as:
  - strength and servicability of repairs compared to original
  - function and aesthetics
  - maintainability and manufacturability
  - preventative maintenance evaluatuion criteria, such as mean time between failure (MBTF) and failure mode effects analysis (FMEA)
  - required quality, cost and sustainability
- design calculations techniques
- typical maintenance design requirements of various industries
- typical repairs, parts, skills and maintenance processes
- hardware specifications and catalogues
- typical maintenance plant, equipment and tools
- plant condition and maintenance assessment techniques
- typical maintenance techniques and technologies for monitoring, preventative maintenance, online and breakdown maintenance, disassembly, repair, reassembly and recommission
- design calculations layout and documentation for design checking and maintenance records
- design process documentation and reports, including specifications and CAD graphics
- software for maintenance planning and repair and modification design, including CAD and stress analysis software
- software and systems, such as system control and data acquisition (SCADA) and distributed control systems (DCS) for maintenance control and information distribution
- developments in repair and modification design
- options for mock-up, modelling and prototyping

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to apply repair and modification techniques consistent with a

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	design brief information, relevant standards and conventions.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • communicate, negotiate and review maintenance brief with stakeholders • determine or confirm scientific principles and design techniques, WHS and regulatory requirements, and design specification requirements • evaluate multiple solutions • investigate life cycle design, sustainability, technical and professional assistance required, and maintenance alternatives for repairs and modifications • plan, schedule and coordinate the maintenance task • solve problems and make decisions with systems thinking for contingencies and constraints, and continuous improvement • define designs, specify and document and apply graphical techniques, modelling, mock-up or prototyping techniques • select components and hardware • create and maintain adequate and accurate calculations and design process records • report and document results and processes.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions

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	(real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Maintenance repair and modification requirements	Maintenance repair and modification requirements may include: • scheduled maintenance required under the maintenance management system • unscheduled maintenance as a result of system/component failure • repairs to restore systems/components to operation • modifications to improve system/component reliability or maintainability • maintenance schedule change or equipment or component modification required because of a change in equipment performance requirements (e.g. changed production or product design) • competitive market pressure and ‘lean maintenance’ • changes in available maintenance technology • resources supply (e.g. materials, labour and skills) • introduction or changes to asset technologies (e.g. mechanical, fluid, electrical, electronic and system control) • sustainability relevant to repair and modification design tasks • WHS, risk and applicable standards and code requirements

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Planning processes	Planning processes may include: • establishing maintenance parameters and design criteria • contributing to the negotiation and advice process • preliminary planning, investigations and costing • identifying design, development, prototyping activities and skills requirements • planning and scheduling design activities • improving, adjusting and rescheduling as required by emergency contingencies and constraints
Design process	Where equipment or component repair or modification design is required the design process includes: • establish design parameters and criteria • research, measurement, experimentation and investigation • generating ideas • synthesis, problem solving and decision making, and addressing constraints • apply scientific principles, calculation and graphics, prototyping and mock-up techniques if required • selection of components and hardware • evaluating solutions against design criteria • consultation, adjustments and agreement • finalise design and sign-off
Design criteria	Design criteria may include: • function and fit for purpose • aesthetics • manufacturability and maintainability • sustainability • cost constraints • ergonomics and anthropometrics and physiology • facilities, plant, services and skills available • WHS and risk
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides

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	• minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer
Life cycle assessment	Life cycle analysis can be used to improve sustainability of repaired or modified equipment or components. It may be applied to all aspects of the repair or modification process

Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements applying to electrical work
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular maintenance repair and

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	modification design task
Prototyping	Prototyping may include: • mock-ups, physical and virtual modelling with post-processing for computer numeric control (CNC) and rapid prototyping
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain

Unit Sector(s)

Competency field

Unit sector Planning

Custom Content Section

Not applicable.

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MEM14089A Integrate mechanical fundamentals into an engineering task

Modification History

Release 1 - New unit. Replaces MEM14081A and MEM23071A, but not equivalent.

Unit Descriptor

This unit of competency covers the integration of mechanical fundamentals to achieve an engineering or related task. It includes identifying task parameters, personal and team functions, chain of responsibility and work health and safety (WHS) guidelines. It includes investigation of machines, mechanisms and mechanical systems, and mechanical fundamentals, such as mechanical methods and processes, workshop techniques, materials, scientific and mathematical principles and computer software. It requires completion of the task in cooperation with the team and documentation of the process and outcomes.

Application of the Unit

The unit applies to engineering or related projects requiring mechanical engineering skills and covers the identification, application and integration of mechanical fundamentals. It is suitable for people working as mechanical designers and draftspersons and those pursuing careers and qualifications in mechanical engineering.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23109A	Apply engineering mechanics principles

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Investigate scope of engineering task	1.1	Identify mechanical and related fundamentals to be integrated into engineering task
		1.2	Identify stakeholders to be consulted
		1.3	Confirm WHS, regulatory requirements, risk management and organisational procedures
		1.4	Review functions and features of machines, mechanisms and mechanical systems required by the task
		1.5	Review software techniques required for task analysis and graphics
2	Integrate mechanical fundamentals	2.1	Use systems thinking to address contingencies and constraints, problem solving and decision making, and continuous improvement to achieve integration task
		2.2	Integrate mechanical fundamentals to achieve task objectives
		2.3	Seek technical and professional assistance or clarification of design information, as required
3	Report results	3.1	Record results of investigation, evaluation and integration
		3.2	Provide documentation, such as diagrams and calculations, programs and files

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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating, cooperating and negotiating with stakeholders
- identifying parameters and context, WHS and regulatory requirements, risk management and organisational procedures
- evaluating requirements, principles, techniques, and typical applications related to task
- selecting software for required analysis and graphics
- planning the task
- solving problems and making decisions using systems thinking and continuous improvement to address contingencies and constraints
- reporting and documenting results of investigation, evaluation and integration, diagrams and calculations
- reviewing sustainability implications, functions and features for the engineering task

Required knowledge

Required knowledge includes:

- WHS and regulatory requirements, codes of practice, and risk minimisation and registration requirements
- mechanical and related fundamentals, including:
  - materials properties
  - mechanics
  - chemistry
  - thermodynamics
  - fluid mechanics
  - fluid power
  - electrical fundamentals
  - and may also include depending on the application:
    - light, sound and electromagnetic effects
- methods and processes for shaping, cutting, joining and coating of metal and other materials
- functions and features of machines, mechanisms and mechanical systems
- current options and tends in software, including system layout and simulation

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to undertake investigation of an engineering task to determine the mechanical fundamentals required by the task and integrating them into a task plan and report the plan and any investigations undertaken.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • determine task parameters and context and identify and investigate required mechanical fundamentals • evaluate task requirements, principles, techniques, typical applications and software • plan the task • integrate mechanical fundamentals to achieve task objectives • communicate, cooperate and negotiate with stakeholders to achieve integration task • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment must cover the integration of two or more mechanical fundamentals to achieve the engineering task.

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	• Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Mechanical and related fundamentals	Mechanical and related fundamentals include fundamentals of: • materials properties • mechanics • chemistry • thermodynamics • fluid mechanics • fluid power • electrical fundamentals and may also include depending on the application: • light, sound and electromagnetic effects
Machines, mechanisms	Machines, mechanisms and mechanical systems may include:

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and mechanical systems	• piston and rotary displacement engines • liquid, gas and steam turbines • pumps and pumping systems • compressors and pneumatic distribution systems • hydraulic systems • fans and ducting systems • heating, ventilation, air conditioning and refrigeration (HVAC/R) systems • mechanical drive systems and transmissions • brakes and clutches • conveyors, elevators, cranes and materials handling plant • boilers and piping systems

Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or

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	projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain
Continuous improvement implementation	Continuous improvement implementation may relate to plant, products, processes, systems or services, including design, development, implementation or manufacture, commissioning, operation or delivery and maintenance. Improvement processes may include techniques, such as: • balanced scorecard • current and future state mapping • measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training
Constraints and contingencies	Constraints and contingencies may include: • financial • organisation procedural or culture • physical constraints, such as limits to resources, limits to site access or logistical limitations
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer

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Unit Sector(s)

Competency field

Unit sector Planning

Custom Content Section

Not applicable.

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MEM14090A Integrate mechatronic fundamentals into an engineering task

Modification History

Release 1 - New unit. Replaces MEM14082A and MEM23072A, but not equivalent.

Unit Descriptor

This unit of competency covers the integration of mechatronic fundamentals to achieve an engineering or related task. It includes identifying task parameters, personal and team functions, and work health and safety (WHS) requirements. It includes investigation of programmable machines, controllers and mechatronic devices, and automated systems and mechatronic fundamentals, including mechatronic methods and processes, workshop techniques, materials, scientific and mathematical principles and computer software. It requires completion of the task in cooperation with the team and documentation of the process and outcomes.

Application of the Unit

The unit applies to engineering or related projects requiring mechatronic engineering skills and covers the identification, application and integration of mechatronic fundamentals. It is suitable for people working as mechatronic or automation technicians and drafters and those pursuing careers and qualifications in mechatronic engineering.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23111A	Select electrical equipment and components for engineering applications
MEM23112A	Investigate electrical and electronic controllers in engineering applications

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Investigate scope of engineering task	1.1	Identify mechatronic and related fundamentals to be integrated into engineering task
		1.2	Identify stakeholders to be consulted
		1.3	Review functions and features of machines, controllers, devices and automated systems requiring mechatronics
		1.4	Confirm WHS, regulatory requirements, risk management and organisational procedures
		1.5	Review software techniques required for task analysis and graphics
2	Integrate mechatronic fundamentals	2.1	Use systems thinking to address contingencies and constraints, problem solving and decision making, and continuous improvement to achieve integration task
		2.2	Integrate mechatronic fundamentals to achieve task objectives
		2.3	Seek technical and professional assistance or clarification of design information, as required
3	Report results	3.1	Record results of investigation, evaluation and integration
		3.2	Provide documentation, such as diagrams, calculations, programs and files

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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating, cooperating and negotiating with stakeholders
- identifying task parameters and context, WHS and regulatory requirements, risk management and organisational procedures
- evaluating task requirements, including principles, techniques, machines, controllers and mechatronic devices, and typical automated systems
- selecting and using software for required analysis and graphics
- planning the task
- solving problems and making decisions using systems thinking and continuous improvement to address contingencies and constraints

reporting and documenting results of investigation, evaluation and integration, diagrams and calculations

- reviewing sustainability implications, functions and features for the engineering task

Required knowledge

Required knowledge includes:

- WHS and regulatory requirements, codes of practice, and risk minimisation and registration requirements
- mechatronic fundamentals, including:
  - mathematics
  - materials properties
  - mechanics
  - electrical and electronic fundamentals

fundamentals of controller programming, interfacing and signal conditioning, and which depending on the application may also include:

- chemistry
- light, sound and electromagnetic effects
- thermodynamics and heating, ventilation and air conditioning (HVAC)
- fluid mechanics
- fluid power
- system control and data acquisition systems (SCADA) and distributed control systems

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(DCS)
  - computing
  - graphics, including computer-aided design and drafting systems (CAD)
- methods and processes for shaping, cutting, joining and coating of metal and other materials
- functions and features of machines, controllers and mechatronic devices and automated systems
- current options and tends in software, including circuit and system layout and simulation

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to undertake investigation of an engineering task to determine the mechatronic fundamentals required by the task and integrating them into a task plan and report the plan and any investigations undertaken.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • determine task parameters and context and identify and investigate required mechatronic fundamentals • evaluate task requirements, principles, techniques, typical applications and software • plan the task • integrate mechatronic fundamentals to achieve task objectives • communicate, cooperate and negotiate with stakeholders to achieve integration task • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to

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	accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment must cover the integration of two or more mechatronic fundamentals to achieve the engineering task. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Appropriate licensed technical and professional	Appropriate licensed technical and professional assistance may

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assistance	include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies may include:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements applying to electrical work
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain
Continuous improvement implementation	Continuous improvement implementation may relate to plant, products, processes, systems or services, including design, development, implementation or manufacture, commissioning, operation or delivery and maintenance.

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	Improvement processes may include techniques, such as: • balanced scorecard • current and future state mapping • measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training
Constraints and contingencies	Constraints and contingencies may include: • financial • organisation procedural or culture • physical constraints, such as limits to resources, limits to site access or logistical limitations
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular engineering integration task
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer

Unit Sector(s)

Competency field

Unit sector Planning

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Custom Content Section

Not applicable.

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MEM14091A Integrate manufacturing fundamentals into an engineering task

Modification History

Release 1 (MEM05v9).

Unit Descriptor

This unit of competency covers the integration of manufacturing fundamentals to achieve an engineering or related task. It includes identifying task parameters, personal and team functions, and work health and safety (WHS) guidelines. It includes investigation of function and features of manufacturing plant, methods and processes and manufacturing fundamentals, including workshop techniques, materials, scientific and mathematical principles, and computer software.

Application of the Unit

The unit applies to engineering or related projects requiring manufacturing engineering skills and covers the identification, application and integration of manufacturing fundamentals. It is suitable for people working as manufacturing technicians and draftspersons and those pursuing manufacturing engineering or related technical qualifications and careers.

If applying the unit into an enterprise or context where knowledge and skills of lean manufacturing techniques is also required, relevant competitive systems and practices units should also be selected.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Investigate scope of engineering task	1.1	Identify manufacturing engineering and related fundamentals to be integrated into engineering task
		1.2	Review current functions and features of manufacturing plant, methods and processes, including production control, process maintenance options, and continuous improvement and lean manufacturing-related systems and processes
		1.3	Identify stakeholders to be consulted
		1.4	Confirm WHS, regulatory requirements, risk management and organisational procedures
		1.5	Review software techniques required for task analysis and graphics
2	Integrate manufacturing fundamentals	2.1	Plan the task
		2.2	Communicate, cooperate and negotiate with stakeholders, as required
		2.3	Use systems thinking to address contingencies and constraints, problem solving and decision making, and continuous improvement to achieve integration task
		2.4	Integrate manufacturing fundamentals to achieve task objectives
		2.5	Seek technical and professional assistance or clarification of design information, as required
3	Report results	3.1	Record results of investigation, evaluation and integration

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3.2 Provide documentation, such as diagrams, graphics, flow charts and calculations

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating, cooperating and negotiating with stakeholders
- identifying task parameters and manufacturing context, WHS, regulatory requirements, risk management and organisational procedures
- evaluating manufacturing principles, systems, methods and processes, and production machinery, such as:
  - lean manufacturing
  - jobbing (individual lot manufacturing)
  - transfer lines
  - cellular manufacturing
  - typical manufacturing departments, such as logistics, warehouse, production, maintenance, scheduling, sales, marketing and administration
- selecting and using software and graphics for required analysis and graphics
- planning the task
- integrating manufacturing fundamentals to achieve task objectives
- solving problems and making decisions using systems thinking and continuous improvement to address contingencies and constraints
- reporting and documenting results of investigation, evaluation and integration, diagrams and calculations
- reviewing sustainability implications, functions and features for the engineering task

Required knowledge

Required knowledge includes:

- WHS and regulatory requirements, codes of practice, and risk minimisation and registration requirements
- manufacturing methods, such as:
  - production control and flow
  - continuous improvement
  - lean techniques for quality, speed, quantity and reliability

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  - manufacturing systems maintenance, such as total productive maintenance
  - jobbing, batch and mass systems
  - production lines and work cells, and batch and queue manufacturing
- functions and features of production machinery and systems related to the task
- general mechanical, electrical and mechatronic engineering fundamentals relevant to manufacturing, such as:
  - materials properties
  - mechanics
  - chemistry
  - thermodynamics
  - fluid mechanics
  - fluid power
  - electrical fundamentals
- current options and trends in software, including manufacturing process simulation software

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to undertake investigation of an engineering task to determine the manufacturing fundamentals required by the task and integrating them into a task plan and report the plan and any investigations undertaken.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • communicate, cooperate and negotiate with stakeholders to achieve manufacturing integration task • determine task parameters and context and identify and investigate required manufacturing fundamentals • identify relevant WHS, regulatory requirements, risk management and organisational procedures • integrate manufacturing fundamentals to achieve task objectives • report and document results.

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Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	**WHS, regulatory requirements and enterprise procedures may include:** • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or

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	projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain.
Continuous improvement implementation	Continuous improvement implementation may relate to plant, products, processes, systems or services, including design, development, implementation or manufacture, commissioning, operation or delivery and maintenance. Improvement processes may include techniques, such as: • balanced scorecard • current and future state mapping • measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training
Constraints and contingencies	Constraints and contingencies may include: • financial • organisation procedural or culture • physical constraints, such as limits to resources, limits to site access or logistical limitations
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer

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Lean principles	Lean manufacturing uses cost, capacity and responsiveness, quality, reliability and waste minimisation as drivers of the process and measures for process improvement. Lean manufacturing is the response of many organisations to local, regional, national and global market competitiveness.

Unit Sector(s)

Competency field

Unit sector Planning

Custom Content Section

Not applicable.

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MEM14092A Integrate maintenance fundamentals into an engineering task

Modification History

Release 1 (MEM05v9).

Unit Descriptor

This unit of competency covers the integration of maintenance fundamentals to achieve an engineering or related task. It includes identifying task parameters, personal and team functions, and work health and safety (WHS) requirements. It includes investigation of maintainable features of plant, facilities and services, and evaluation of related fundamentals of mathematics, scientific principles, workshop skills, materials and processes, and software required by the task. It requires completion of the task in cooperation with the team and documentation of the process and outcomes.

Application of the Unit

The unit applies to engineering and related tasks in a project or organisation and covers the identification, application and integration of maintenance fundamentals, including breakdown and preventative maintenance fundamentals. It is suitable for people working as maintenance technicians and draftspersons and those pursuing careers and qualifications in maintenance engineering.

This unit should be undertaken in conjunction with technical units relevant to the equipment and processes used in the organisation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	**Investigate scope of engineering task**	1.1	Identify the breakdown and preventative maintenance and other related fundamentals to be integrated into engineering task
		1.2	Identify stakeholders to be consulted
		1.3	Confirm WHS, regulatory requirements, risk management and organisational procedures
		1.4	Identify maintainable features of plant, facilities and services affected by integration task
		1.5	Identify methods, processes and workshop techniques required by task
		1.6	Review sustainability implications for task
		1.7	Review software techniques required for task analysis and graphics
		1.8	Plan task to maximise performance and reliability and prevent future breakdowns
2	**Integrate maintenance fundamentals**	2.1	Use systems thinking to address contingencies and constraints, problem solving and decision making, and continuous improvement to achieve integration task
		2.2	Consult with stakeholders on timing and scope of integration task

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	2.3	Integrate maintenance fundamentals to achieve task objectives
	2.4	Seek technical and professional assistance or clarification of design information, as required
3 Report results	3.1	Record results of investigation, evaluation and integration
	3.2	Provide documentation, such as diagrams, calculations, programs and files

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating, cooperating and negotiating with stakeholders
- identifying task parameters and context, WHS and regulatory requirements, risk management and organisational procedures
- evaluating task requirements, including principles, methods, processes and construction techniques, maintainable features of plant, facilities and services
- selecting and using software required for analysis and graphics
- evaluating maintenance-related task activities for effect on performance, reliability and prevention of failure
- solving problems and making decisions using systems thinking and continuous improvement to address contingencies and constraints

reporting and documenting results of investigation, evaluation and integration, diagrams and calculations

- reviewing sustainability implications, functions and features for the engineering task

Required knowledge

Required knowledge includes:

- maintenance and related fundamentals may include:
  - materials properties
  - maintenance methods and processes

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  - mechanics
  - chemistry
  - thermodynamics
  - fluid mechanics
  - fluid power
  - electrical and electronic fundamentals
  - fundamentals of controller programming, interfacing and signal conditioning
  - computing
  - graphics, including computer-aided design (CAD)
  - workshop and maintenance equipment
- functions and maintainable features of plant, facilities and services
- maintenance methods and procedures:
  - breakdown maintenance
  - preventive maintenance
  - predictive maintenance (on-condition)
  - precision maintenance
  - proactive maintenance
  - reliability centred maintenance and modification
  - total productive maintenance
  - repair and replace methods and processes
- role and application of maintenance-related risk management procedures and analysis
- current options and tends in maintenance software
- typical software applications for engineering maintenance fundamentals

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to undertake investigation of an engineering task to determine the maintenance fundamentals required by the task and integrating them into a task plan and report the plan and any investigations undertaken.
Critical aspects for assessment and	Assessors must be satisfied that the candidate can

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evidence required to demonstrate competency in this unit	competently and consistently: • communicate, cooperate and negotiate with stakeholders to achieve integration task • determine task parameters and context, chain of responsibility, WHS, regulatory requirements, risk management and organisational procedures • evaluate task requirements, principles, techniques, typical applications and software • plan the task • integrate maintenance fundamentals to achieve task objectives • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities. •
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of

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	process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Integrate maintenance fundamentals	Integrate maintenance fundamentals refers to situations where maintenance skills and knowledge must be applied across more than one engineering, system or application area to achieve a task objective

Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, may include:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment,

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	sealing and fastening
WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain.
Continuous improvement implementation	Continuous improvement implementation may relate to plant, products, processes, systems or services, including design, development, implementation or manufacture, commissioning, operation or delivery and maintenance. Improvement processes may include techniques, such as: • balanced scorecard • current and future state mapping • measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training

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Constraints and contingencies	Constraints and contingencies may include: • financial • organisation procedural or culture • physical constraints such as limits to resources, limits to site access or logistical limitations

Maintenance system data	Maintenance system data may include:
	• asset ID and plant warranties
	• standard repair schemes
	• modification data and configuration
	• procedural documents:
	  • monitoring and preventative maintenance schedules
	  • safe work methods statements
	  • material safety data sheets (MSDS)
	  • work permits
	• monitoring reports and system measurements
	• maintenance actions and costs
	• spares inventory control

Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular engineering integration task
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer

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Unit Sector(s)

Competency field

Unit sector Planning

Custom Content Section

Not applicable.

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MEM15001B Perform basic statistical quality control

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers taking samples and applying a statistical process to monitor production.

Application of the Unit

Application of the unit	This unit applies to the collation and interpretation of statistical data in the context of statistical quality control, for example, tally, run or control charts. Uncontrolled variations are reported to appropriate authority. When the production and interpretation of charts and graphs not dependent on knowledge and understanding of the implications for quality are required, Unit MEM12024A (Perform computations) should be accessed. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Take samples	1.1. Difference between population and sample is understood and various sampling schemes are applied in accordance with standard operating procedures.
2. Apply statistical process to monitor production	2.1. Concept of variation in terms of average and spread is understood. Data is used to produce relevant statistical information. 2.2. Data is interpreted accurately and information is presented to appropriate authority according to standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE
Required skills
Look for evidence that confirms skills in: • reading, interpreting and following information on written job instructions, standard operating procedures, charts, lists, drawings and other applicable reference documents • applying statistical process control procedures in accordance with instructions to a given production process • obtaining data from samples including average, range and random or assignable causes • producing tally, run or control charts from sampling data • reporting information from sampling data • checking and clarifying task-related information • completing proformas and standard workplace forms
Required knowledge
Look for evidence that confirms knowledge of: • the difference between population and sample, and the concept of variation in terms of average and range, random and assignable causes • numerical operations and statistical calculations/formulae within the scope of this unit • statistical process control procedures, which may include Six Sigma etc. and the sampling procedures to be followed • the types of charts that can be produced to assist monitoring of products including run charts, tally charts, histograms, control charts • procedures for reporting sample data information • use and application of personal protective equipment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must

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EVIDENCE GUIDE	
	be able to perform basic statistical quality control.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing basic statistical quality control or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Sampling schemes	Agreed customer plans, Acceptable Quality Level (AQL) and Average Outgoing Quality Level (AOQL) plans, Shainin, Six Sigma etc.
Relevant statistical information	Average, range and process control data and the plotting of charts such as line graphs, run charts, tally charts, histograms, control charts, random and assignable causes etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Quality

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MEM15002A Apply quality systems

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers working within a quality improvement system, either individually or in a team situation.

Application of the Unit

Application of the unit	This unit is applicable for any work within a quality improvement system in a manufacturing, engineering or related environment. The definition of customer is wide and applies to the next person or organisation receiving the product or service. Application may include quality inspection of own or other employee's work up to the level of the employee's technical competence. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Work within a quality system	1.1. Instructions and procedures are followed and duties are performed in accordance with requirements of quality improvement system. 1.2. Conformance to specifications is ensured. 1.3. Defects are detected and reported according to standard operating procedures. 1.4. Performance of operation or quality of product or service is monitored to ensure customer satisfaction.
2. Engage in quality improvement	2.1. Current performance is assessed. 2.2. Established performance measures are identified. 2.3. Specifications and standard operating procedures are identified. 2.4. Defects are detected and reported according to standard operating procedures. 2.5. Process improvement procedures are participated in. 2.6. The improvement of internal/external customer/supplier relationships is participated in. 2.7. Performance of operation or quality of product or service is monitored to ensure customer satisfaction.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading, interpreting and following information on written job sheets, instructions, standard operating procedures and drawings
- checking and clarifying task-related information
- entering information onto workplace documents
- checking for conformance to specifications
- identifying duties of the individual within the quality improvement system
- identifying customers' requirements with respect to the operation or quality of the product or service
- reporting where appropriate, defects detected
- carrying out work in accordance with the process improvement procedures
- carrying out work in a manner consistent with the improvement of customer/supplier relationships
- performing numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Look for evidence that confirms knowledge of:

- quality system terminology and concepts, e.g.
  - quality assurance - planning to meet customers' requirements
  - quality control - checks and procedures to ensure customer requirements are met
  - quality inspection - inspecting and testing products and services
  - total quality control - a company-wide approach that combines both quality assurance and quality control so that the customer is always satisfied
- commonly accepted meaning/s of the terms quality and quality system
- the reasons for following the requirements of the quality improvement system
- strategies and approaches for working within a quality system
- procedures to be followed in undertaking the work
- specifications to which the individual's work is to comply
- reasons for ensuring work conforms to specification
- benefits of good quality:

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REQUIRED SKILLS AND KNOWLEDGE
• quality products • reduced costs • customer confidence, satisfaction and loyalty • good reputation • job satisfaction • solving problems • increased competitiveness • keeping up with technology • costs and consequences of poor quality e.g. • lost customers • accidents • wastage • lost time • low morale • conflict • procedures for reporting defects • examples of common defects • quality improvement procedures • four steps of the quality cycle: plan, do, check, act • reasons for following process improvement procedures • examples of ways in which customer/supplier relationships can be improved • benefits of good customer/supplier relationship • hazards and control measures associated with applying quality procedures, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply quality systems.
Critical aspects for assessment and	Assessors must be satisfied that the candidate can

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EVIDENCE GUIDE	
evidence required to demonstrate competency in this unit	competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying quality systems or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised

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RANGE STATEMENT	
wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Quality improvement system	A system comprising some or all of the following elements: • quality assurance • quality control • quality inspection • quality improvement • total quality control
Customer	The next person or organisation receiving the production or service

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Quality

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MEM15003B Use improvement processes in team activities

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers identifying improvements and/or solving problems, implementing/monitoring the implementation of an improvement strategy, and evaluating the improvement.

Application of the Unit

Application of the unit	This unit applies to quality circle participation using problem solving techniques including flow charts, cause and effect diagrams, Pareto charts, histograms, run charts and graphs, control charts, scattergrams etc. as required. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM16007A	Work with others in a manufacturing, engineering or related environment

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify areas for improvement and/or solve problems	1.1. Participation in team is used to select improvement tools and methods appropriate to the situation. 1.2. Teamwork is used to process improvement tools to identify improvements and/or solve problems.
2. Implement improvement strategy	2.1. Teamwork is used to implement improvement strategies as required in accordance with standard operating procedures. 2.2. In conjunction with work team, further action is recommended as required using standard operating procedures.
3. Monitor implementation of improvement	3.1. Performance is monitored for change, utilising feedback data.
4. Evaluate improvement	4.1. Analytical tools are used to evaluate improvement as required. 4.2. In conjunction with work team, further action is recommended where required using standard operating procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- participating and communicating in a team setting
- identifying improvements and/or solving problems in a team setting
- implementing improvement strategies in a team setting
- recommending further action in accordance with standard operating procedures
- collecting and collating feedback data
- evaluating the improvement strategy implemented
- reading, interpreting information on written job instructions, specifications, charts, lists, drawings and other applicable reference documents
- planning and sequencing tasks
- checking and clarifying information
- entering information onto workplace documents
- following verbal instructions
- orally reporting routine information

Required knowledge

Look for evidence that confirms knowledge of:

- roles and functions of self and team members
- team discussion and problem solving processes
- improvement tools and methods and their application
- procedures for using process improvement tools in the team environment
- improvement strategies
- procedures for implementing the improvement strategies
- the individual's role in implementing improvement strategies
- procedures for initiating further action
- the procedures for collecting and collating improvement feedback data
- the analytical tools and processes to evaluate the improvement strategy
- safe workplace practices

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to use improvement processes in a team environment. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using improvement processes in team activities or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit of. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for	

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EVIDENCE GUIDE	
assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Improvement tools and methods	Flow charts, cause and effect diagrams, Pareto charts, histograms, run charts and graphs, control charts, scattergrams etc.
Improvement strategies	PDCA (Plan, Do, Check, Act) procedures, Six Sigma techniques, Root Cause Analysis, etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Quality

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MEM15004B Perform inspection

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers inspecting products, keeping records and providing feedback on the conformance of product to specifications.

Application of the Unit

Application of the unit	This unit applies to basic inspection of completed or partly completed products produced by others. Inspection is carried out according to a site quality plan or specifications; it applies to a range of manufacturing enterprises; and requires application of a range of measuring equipment/devices/tools. Location and frequency of checks/tests and measurements are undertaken to standard operating procedures. In general, verification should be made as close as possible to the point of production of the feature or characteristic. Inspection may involve 'first piece inspection', fixed interval, sample etc. Depending on the inspection process, other technical units may need to be accessed, for example, appropriate measurement units. This unit is not intended to be applied to maintenance personnel carrying out their day-to-day activities, for example, fault finding, remedial and checking activities. These skills are covered by other units such as Unit MEM18006C (Repair and fit engineering components). This unit should not be selected for the purposes of non destructive testing, where Unit MEM24002B (Perform penetrant testing), Unit MEM24004B (Perform magnetic particle testing), Unit MEM24006B (Perform eddy current testing), Unit MEM24008B (Perform ultrasonic testing) or Unit MEM24010B (Perform radiographic testing) have already been selected.

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	Band: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA
1. Inspect products	1.1. Products are tested for conformance to specifications in accordance with standard operating procedures.
2. Keep records	2.1. Test status identification is made on conforming and non-conforming products and records are accurately kept using standard operating procedures.
3. Provide feedback	3.1. Products are tested/inspected/measured after rework or repair. 3.2. Deficiencies or deviations are reported according to standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading, interpreting and following information on written job instructions, standard operating procedures and other applicable reference documents
- testing products for conformance to specifications in accordance with job instructions
- testing reworked/repaired products for conformance to specification, in accordance with job instructions
- entering routine and familiar information onto proformas and standard workplace forms

Required knowledge

Look for evidence that confirms knowledge of:

- the procedures as defined by job instructions to be used to check conformance to specifications
- the data to be recorded and the frequency of recording required
- the consequences of not keeping accurate records
- non-conformances of given products that can be removed by rework/repair in accordance with job instructions
- hazards and control measures associated with performing basic inspection activities
- use and application of personal protective equipment
- safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform inspection (basic).
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing inspection (basic) or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes,

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EVIDENCE GUIDE	
	standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Tested for conformance to specifications	Visual inspection, physical measurements, chemical tests, checks against patterns, templates and guides etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Quality

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MEM15005B Select and control inspection processes and procedures

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers selecting inspection and test procedures, and controlling the inspection/test environment and equipment.

Application of the Unit

Application of the unit	The unit applies to a range of manufacturing enterprises where inspection involves working autonomously and taking responsibility for overseeing inspection process and environment. This person would use a wide range of equipment/instruments and take responsibility for the reliability of inspection results to ensure conformance to specifications. This unit is not intended to be applied to maintenance personnel carrying out their day-to-day activities, for example, fault finding, remedial and checking activities. These skills are covered by other units, such as Unit MEM18006C (Repair and fit engineering components) **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM15004B	Perform inspection

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Select inspection/test procedures	1.1. Appropriate methods of inspection are selected and implemented. 1.2. Inspection/test procedures are monitored to ensure desired outcomes.
2. Control inspection/test environment and equipment	2.1. Environmental conditions are monitored to ensure reliability of tests and results. 2.2. Equipment/instruments are checked for correct calibration. 2.3. Calibration of equipment/instruments is initiated or undertaken against appropriate standard as required. 2.4. Calibration records are maintained to standard operating procedure.

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ELEMENT	PERFORMANCE CRITERIA
	2.5. If equipment/instruments are found to be out of calibration, validity of previous results is checked and reported according to standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading, interpreting and following information on standard operating procedures and other applicable reference documents • checking and clarifying task-related information • entering and maintaining information onto proformas and standard workplace forms and records • checking for conformance to specifications • using measurement equipment within the scope of this unit • measuring components to specified tolerances • implementing inspection method for the product/ process • monitoring inspection/test procedures to ensure desired outcomes are achieved • monitoring environmental conditions • checking calibration of measuring equipment • initiating calibration of measuring equipment • calibrating measuring equipment against the appropriate reference standard • detecting and reporting out of calibration equipment • applying units of measurement and numerical operations/calculations within the scope of this unit
Required knowledge
Look for evidence that confirms knowledge of: • a range of inspection methods and their application • the appropriate inspection method for the process/product • procedures for implementing inspection methods • the desired/target outcomes of the inspection/test procedures • reasons for discrepancies/trends • procedures for monitoring inspection/test procedures

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REQUIRED SKILLS AND KNOWLEDGE
• the effects of environmental conditions on test equipment and the results • procedures for monitoring environmental conditions • the acceptable range of variations to environmental conditions • the correct operation of the measuring equipment • the specifications of the measuring equipment • procedures for checking the calibration of the measuring equipment • appropriate techniques, tools and equipment to measure components • units of measurement and numerical operations/calculations within the scope of this unit • codes, standards, legislative or regulatory requirements applicable to the measuring equipment and/or calibration • procedures for initiating the calibration of measuring equipment • the physical reference standard against which the measuring equipment is to be calibrated • procedures for calibrating measuring instruments • tools and equipment required to calibrate measuring equipment • procedures for recording calibration details • the reasons for keeping calibration records • the procedures to be followed when measuring equipment is found to be out of calibration • the reasons for checking results from out of calibration measuring equipment • procedures for reporting out of calibration measuring equipment • hazards and control measures associated with inspection, including housekeeping • use and application of personal protective equipment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform inspection (advanced). Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and	Assessors must be satisfied that the candidate can

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EVIDENCE GUIDE	
evidence required to demonstrate competency in this unit	competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing inspection (advanced) or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different

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RANGE STATEMENT	
work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Quality

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MEM15007B Conduct product and/or process capability studies

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers conducting process capability studies, setting control limits and selecting sampling plans.

Application of the Unit

Application of the unit	This unit applies to the analysis of data from a production section or processes using appropriate statistical techniques. Consultation may be required with production or process personnel and is undertaken within the enterprise's total quality plan. **Band**: **B** **Unit Weight**: **6**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM12024A	Perform computations
	MEM12025A	Use graphical techniques and perform simple statistical computations

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Prerequisite units		
	MEM15001B	Perform basic statistical quality control
	MEM15008B	Perform advanced statistical quality control

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Conduct process capability studies	1.1. Procedure for conducting capability study is determined. 1.2. Instructions for personnel conducting trial run are prepared. 1.3. Data from trial run is analysed and the process capability is calculated. 1.4. Possible number of product defects from a particular process is estimated. 1.5. Optimum target mean to suit process capability data is determined. 1.6. Reports listing various options from process capability studies are prepared.

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ELEMENT	PERFORMANCE CRITERIA
	1.7. Design specifications based on an analysis of data are recommended.
2. Set control limits	2.1. Control limits for sample/subgroup average, range and standard deviation are calculated. 2.2. Warning limits for subgroup average, range and standard deviation are calculated. 2.3. Course of action resulting from out of control situation is determined and documented to standard operating procedures.
3. Select sampling plans	3.1. Appropriate sampling plan to suit production schedule is selected and acceptable quality limits are determined, taking into account specified producer and consumer risks. 3.2. Sampling plan is documented including implementation strategy.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • collecting and collating data • analysing data, identifying solutions and developing recommendations • preparing reports listing the various options identified from the process capability study • determining process design specifications from process capability data • documenting sampling plan and implementation strategy
Required knowledge
Look for evidence that confirms knowledge of: • the process to be studied • the procedures for conducting process capability studies • the data used to calculate the process capability • the procedures for estimating the possible number of product defects • options for improving the process and benefits of each

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REQUIRED SKILLS AND KNOWLEDGE
• the procedures for determining the optimum target mean • the procedures for setting control limits • numerical operations and calculations/formulae for process capability, control limits and other outcomes within the scope of this unit • the procedures for setting warning limits • the concept of 'out of control' situations • the action to be taken when an 'out of control' situation is detected • the procedures for documenting 'out of control' situations • the acceptable level of quality • a variety of sampling plans and their application • the sampling plan to be applied to a given situation • the reasons for selecting the chosen plan • the acceptable quality limits • the risks associated with identifying acceptable quality limits for the producer and customer • the procedures for documenting and implementing sampling plans • hazards and control measures • use and application of personal protective equipment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to conduct product and/or process capability studies. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for	This unit may be assessed on the job, off the job or a

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EVIDENCE GUIDE	
assessment	combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with conducting product and/or process capability studies or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Procedure	Frequency of sample, sample size
Data	From periodic samples drawn from a trial run of the process
Process capability	The natural tolerance of the process which may be calculated at 3 sigma/standard deviations
Product defects	From a consideration of 3 or 6 sigma standard deviations compared to specification requirements etc.
Various options	Adjustment of process to move average; improvements to reduce process capability; changes to reduce assignable causes
Appropriate sampling plan	Plans within the adopted quality system, sample size, frequency of sample etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Quality

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MEM15008B Perform advanced statistical quality control

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers constructing control charts.

Application of the Unit

Application of the unit	This unit involves the understanding of statistical processes and the application of these processes to the maintenance and improvement of a quality system. **Band**: **B** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM12024A	Perform computations
	MEM12025A	Use graphical techniques and perform simple statistical computations
	MEM15001B	Perform basic statistical quality control

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Construct control charts	1.1. The key product parameters to be controlled are determined. 1.2. Control charts/proformas including the determination of control limits from sample data are completed. 1.3. 1, 2 and 3 sigma limits are used to measure and describe population dispersion as required.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • constructing control charts, including determining control limits from sample data

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REQUIRED SKILLS AND KNOWLEDGE
• identifying the key parameters to be controlled from a given specification • calculating the population dispersion for given data in terms of 1, 2 and 3 sigma limits
Required knowledge
Look for evidence that confirms knowledge of: • procedures for constructing control charts and determining control limits from sample data • population dispersion in terms of 1, 2 and 3 sigma limits • safe workplace practices

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform advanced statistical quality control. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication,

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EVIDENCE GUIDE	
	materials handling, recording and reporting associated with performing advanced statistical quality control or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Product parameters	Dimensions, weights, voltages, temperatures, speeds etc.
Control charts/proformas	Shewart Charts or charts for process average, range, or attributes etc.
Sample data	Periodic samples drawn from a trial run of the process

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Quality

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MEM15010B Perform laboratory procedures

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers working under laboratory conditions, performing calibration of equipment and writing reports on the results.

Application of the Unit

Application of the unit	This unit applies to the use of a range of sophisticated equipment that provides independent feedback on quality processes and procedures. Individuals are likely to be working autonomously and following scientific procedures under controlled conditions. All work would be carried out to predetermined standard operating procedures. This unit would be taken in conjunction with appropriate technical units. **Band**: **B** **Unit Weight**: **8**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Work under laboratory conditions	1.1. Independent tests are conducted under controlled conditions.
2. Perform calibration	2.1. Equipment is verified and calibrated to agreed quality standards. 2.2. Calibration status is safeguarded against unauthorised adjustment. 2.3. Accurate records are kept for reference purposes. 2.4. Test equipment is periodically recalled for adjustment, repair and re-calibration. 2.5. Documentary evidence is maintained, covering identification of equipment; frequency of re-calibration; calibration status and procedures for recall, handling and storage, adjustment, repair,

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ELEMENT	PERFORMANCE CRITERIA
	calibration, installation and use. 2.6. Calibration to reference standards of known accuracy such as national or international standards is traced, or where these do not exist, is set to specifically developed criteria.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • obtaining, reading and interpreting relevant drawings, circuits, specifications, instructions and data in accordance with standard operating procedures • planning and sequencing operations • checking and clarifying task-related operations • using calculations and numerical operations within the scope of this unit • conducting independent tests under controlled conditions • checking measuring equipment for correct calibration against the agreed quality standards • safeguarding the calibration status of the equipment against unauthorised adjustment • completing and maintaining records of measuring equipment calibrated • recalling test equipment for adjustment, repair and re-calibration • using reference standards or specific criteria as the basis for calibration. • documenting test results • preparing reports on the tests carried out • conducting inspections, tests and audits in accordance with standard • using results of inspections, tests and audits to inform the design and service
Required knowledge
Look for evidence that confirms knowledge of: • the tests to be undertaken • the conditions under which the tests are to be undertaken • the testing procedures to be followed • the reasons for conducting tests under controlled conditions

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REQUIRED SKILLS AND KNOWLEDGE
• the need for tests to be conducted independently • the quality standards against which the measuring equipment is to be calibrated • the correct operation of the measuring equipment • the specifications of the measuring equipment • the tools and equipment required to check the calibration of the measuring equipment • the procedures for checking the calibration of the measuring equipment • any codes, standards, legislative or regulatory requirements applicable to the measuring equipment and/or calibration • the procedures for preventing unauthorised adjustment of equipment • the reasons for protecting equipment against unauthorised adjustment • the records to be kept with respect to the calibration of measuring equipment • the reasons for keeping accurate calibration records • the procedures for recalling test equipment for adjustment, repair and re-calibration • the frequency of test equipment recall • the reasons test equipment may be recalled • all relevant documentation relating to the calibration/re-calibration of test equipment • the procedures for completing the relevant documentation • sources of reference standards and procedures to be used in the absence of reference standards • the reports to be prepared/provided with respect to the test equipment being tested • the procedures for preparing/ providing reports on tests carried out on test equipment • the auditing processes to be applied to testing procedures • the use of information from the inspections, tests and audits conducted in the development of design and servicing of products/equipment • hazards and control measures associated with performing laboratory procedures, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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EVIDENCE GUIDE	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform laboratory procedures.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing laboratory procedures or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Tests	Tests will be conducted to a standard method and may be: • mechanical tests such as for hardness, tensile and impact • electrical tests such as for resistance, capacitance and inductance • semiconductor or other electronic tests
Calibration	Calibration refers to those calibrations which are conducted to a specified standard using equipment available in the workplace/laboratory. It may include the testing of known standard samples
Test equipment	May be mechanical, electrical or electronic or some combination
Documentary evidence	Documentary evidence of calibration will be sufficient to satisfy the needs the certifying body (e.g. NATA) or as otherwise specified in the calibration standard or in accordance with manufacturers' recommendation
Documented	Documentation of test/calibration results will conform to good laboratory practice and will allow for the verification of results and for a historical record of results such as might be required for verification of results, quality audits and legal inquiries.

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Quality

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MEM15011B Exercise external quality assurance

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers liaising with external suppliers, checking for conformance to specifications, assessing the external suppliers and evaluating their goods and/or services.

Application of the Unit

Application of the unit	This unit applies to evaluating and communicating with a wide range of supplier enterprises to ensure that purchased supplies meet quality standards and that adequate documents are prepared and maintained to standard operating procedures. **Band**: **B** **Unit Weight**: **6**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM15004B	Perform inspection
	MEM15005B	Select and control inspection processes and procedures

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Liaise with external suppliers	1.1. The exact quality requirements are communicated to suppliers. 1.2. Quality assurance system is negotiated and agreed. 1.3. Verification method and systems and procedures for dispute settlement are established and agreed. 1.4. Recording system of procured products or services which ensures traceability is established.
2. Check for conformance to specifications	2.1. The requirements of all relevant documentation including contract specifications, drawings and purchase orders are obtained and understood. 2.2. The conformance of the procured product or service to all of the documented requirements is established.
3. Assess external suppliers	3.1. Assessment and evaluation of suppliers' capability and/or quality system are conducted. 3.2. Suppliers' goods or services are evaluated.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- communicating quality requirements to the supplier
- negotiating quality assurance system
- implementing system for recording and tracing products or services procured
- obtaining and interpreting relevant drawings, specifications, documentation etc.
- checking products/materials or services provided for conformance to documented requirements/ specifications
- assessing supplier capability to provide the required product/material or service
- evaluating supplier quality systems
- evaluating supplier goods or services
- using communication and conflict resolution

Required knowledge

Look for evidence that confirms knowledge of:

- the exact quality requirements of the product/material to be supplied
- the procedures to be followed to ensure the supplier understands the quality requirements
- the requirements of a quality assurance system to ensure the supplied product/material conforms to the quality requirements
- the procedures for negotiating agreements with suppliers
- the procedures for verifying that the agreed quality assurance system is being utilised by the supplier
- techniques for dispute resolution
- the procedures for recording procured products or services
- the means of tracing procured products or services
- the reasons for tracing procured products or services
- the specifications of the product/material to be supplied or service to be provided
- any variations from documented requirements/ specifications
- the procedures for assessing/evaluating a supplier's capability to supply the required product/material or service
- the procedures for evaluating a supplier's quality system
- the procedures for evaluating a supplier's goods or services
- any equipment and techniques required to carry out the evaluation procedures
- hazards and control measures within the scope of this unit
- use and application of personal protective equipment

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REQUIRED SKILLS AND KNOWLEDGE
• safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to exercise external quality assurance. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with exercising external quality assurance or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not

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EVIDENCE GUIDE	
	require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Quality assurance system	ISO 9000 procedures, Six Sigma procedures, sampling plans of all kinds etc.
Traceability	Unique identification of individual product or batches as appropriate
Assessment and evaluation	Vendor rating procedures, design reviews, audit reports, site surveillance reports, failure reports and concession applications etc.

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Quality

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MEM15012B Maintain/supervise the application of quality procedures

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers improving the quality system, and collecting and summarising data to support the quality improvement process.

Application of the Unit

Application of the unit	The data would be used to produce statistical information such as averages and ranges, and charts such as tally, run or control charts. This unit applies to the standards that are applicable to the supervision or maintenance of a quality improvement system either individually or in a team situation. The definition of customer is wide and applies to the next person or organisation receiving the product or service. **Band**: **B** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units		
Path 1	MEM12024A	Perform computations
	MEM12025A	Use graphical techniques and perform simple statistical computations
	MEM15001B	Perform basic statistical quality control

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Improve quality system	1.1. Specifications to meet customer needs (internal and external) are interpreted. 1.2. Leadership role as a supplier is undertaken to ensure quality within the supply chain.
2. Collect and summarise data	2.1. Data is recorded and interpreted accurately in accordance with standard operating procedures. 2.2. Data is used to produce relevant statistical information, for example, average and range or the production of charts such as tally, run or control

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ELEMENT	PERFORMANCE CRITERIA
	charts.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • obtaining and interpreting the specifications of the product or service to be provided • communicating effectively with suppliers and customers • recording data collected • calculating relevant statistical information from collected data • producing tally, run and control charts from collected data • using leadership skills • using analysis skills
Required knowledge
Look for evidence that confirms knowledge of: • specifications to be achieved in providing the service or producing the product • the team's supplier(s) and customer(s) • the possible effects of supplying products and/or services to customers that do not comply with specifications • the procedures to be followed in producing the product and/or supplying the service • the checks to be undertaken to ensure the product/service complies with specifications • the personnel responsible for the quality of the product/service provided • the actions to be taken when a non-conformance to specifications is detected and reasons for taking those actions • the procedures for recording data collected • the possible trends from the collected data • the actual trends indicated by given samples of data • the reasons for collecting data • the statistical information to be calculated • the use of statistics in interpreting production data

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REQUIRED SKILLS AND KNOWLEDGE
• the functions of tally, run or control charts in representing production data • the trends indicated by the statistical information calculated and/or the charts produced • the action to be taken in response to any trends identified • the reasons for taking proposed action • appropriate techniques, tools and equipment to measure machined components • hazards and control measures within the scope of this unit • use and application of personal protective equipment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to maintain/supervise the application of quality procedures. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated

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EVIDENCE GUIDE	
	with maintaining/supervising the application of quality procedures or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Customer needs	• Product • Service • Delivery and distribution • Quality • Quantity • Price • Communication and documentation

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Quality

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MEM15024A Apply quality procedures

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers applying established quality procedures to an employee's own work within a manufacturing, engineering or related environment.

Application of the Unit

Application of the unit	This unit covers essential skill and knowledge that underpins all units within the Metal and Engineering Training Package. This competency is applied to an individual's own work. It includes concepts of meeting customer needs to achieve outcomes that are 'fit for purpose'. This includes following quality procedures to conform to specifications and requirements. **Band**: **A** **Unit Weight**: There is no unit weighting for this unit.

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Take responsibility for own quality	1.1. Concept of supplying product or service to meet the customer requirements (internal and external) is understood and applied. 1.2. Responsibility is taken for quality of own work.
2. Apply standard procedures of workplace quality to own job	2.1. Quality system procedures are followed. 2.2. Conformance to specifications is ensured.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • identifying and communicating instances of non-compliance to work specifications • following quality procedures including work instructions • conforming to product and process specifications • checking and clarifying task-related information
Required knowledge
Look for evidence that confirms knowledge of: • concepts of quality and the benefits of using specifications and standard operating procedures • quality procedures applying to own work • standard operating procedures • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply quality procedures.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic

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EVIDENCE GUIDE	
	workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying quality procedures or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Quality	Consistently meeting customer requirements

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Quality

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MEM16002C Conduct formal interviews and negotiations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers planning and conducting interviews, participating in interviews and taking part in negotiations.

Application of the Unit

Application of the unit	This unit applies to effective communication in more formal on-site or small group situations where ideas are defined and specific outcomes are sought. The topics covered are often formally identified and records may be kept. Interviews could include job recruitment and progression, performance reviews, grievance, etc. This unit does not cover the skills needed for participation in formal group processes such as meetings which are covered by Unit MEM16001B (Give formal presentations and take part in meetings). For interviews associated with training and assessment, refer to the appropriate units. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and conduct interviews	1.1. Interview is planned and initiated to achieve a specified purpose. 1.2. Suitable questions appropriate to the purpose are used. 1.3. Discretion and confidentiality are exercised where appropriate.
2. Participate in interviews	2.1. Appropriate preparation is undertaken. 2.2. Active listening skills are employed. 2.3. Self-presentation is applied appropriate to the purpose. 2.4. Questions are asked where appropriate. 2.5. Follow-up activities are clarified and reported in accordance with standard operating procedure.
3. Take part in negotiations	3.1. Language appropriate to the other party is used.

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ELEMENT	PERFORMANCE CRITERIA
	3.2. Own and others' needs/wants are stated and clarified. 3.3. The views of fellow employees, including own group or team, are represented to others. 3.4. The appropriate communication medium is selected. 3.5. Follow-up activities are clarified and reported in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- planning and formatting interviews
- developing open and closed interview questions to gain required information
- building rapport
- maintaining discretion and confidentiality
- preparing for interviews
- using active listening skills
- identifying interview goals
- identifying selection/assessment criteria
- clarifying follow-up activities
- reporting follow-up activities
- using appropriate language to the other party(s)
- clarifying needs/wants of others
- representing the views of fellow team or group members during negotiations
- selecting appropriate communication media during the negotiations

Required knowledge

Look for evidence that confirms knowledge of:

- the purpose of the interview
- the assessment criteria for the interview
- the procedures to be followed in planning and conducting the interview
- the detail/information to be obtained from the interview
- questions appropriate to the detail/information to be obtained

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REQUIRED SKILLS AND KNOWLEDGE
• active listening techniques that can be applied in interview situations • the effect(s) of the individual's presentation during the interview upon the interview • the effect(s) of the timing of questions on the interviewee • the need to follow-up issues raised during the interview and negotiations • the procedures for reporting the outcomes of follow-up activities • the parties to be involved in the negotiations • the reasons for using appropriate language • the reasons for maintaining confidentiality • the reasons for clarifying the needs/wants of others • the needs/wants of the individual • the views of fellow team or group members • a range of communication media • the appropriate communication medium • safe workplace practices

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to conduct formal interviews and negotiations.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment

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EVIDENCE GUIDE	
	should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with conducting formal interviews and negotiations or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Preparation	• Identifying and inviting co-interviewers • Planning interview • Preparation of interview room • Accessing required documents and materials • Introductions and explanations
Active listening skills	• Appropriate body language

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RANGE STATEMENT	
	• Acknowledgements • Clarification questions • Appropriate responses
Communication medium	• Face-to-face meeting • Telephone • Email • Written • Advocacy

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Communication

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MEM16003B Provide advanced customer service

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers identifying a customer's relationship to the enterprise and the customer's requirements, acting on the customer's requirements, and promoting better customer service.

Application of the Unit

Application of the unit	This unit applies to the provision of comprehensive assistance to customers across a range of products and services. Situations covered would be beyond simple sales or enquiries and could include the taking of one-off or special orders requiring detailed descriptions, the handling of complaints referred for more detailed assistance than the initial point of contact, work as a designated liaison officer etc. Customers can be internal or external. Customer liaison can be undertaken through telephone, written, email or face-to-face contact. Typical applications of this unit would be found in warehouses, service and design departments. **Band**: **B** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify customer relationship to enterprise	1.1. For repeat customers, formal customer identification details are obtained and checked, for example, by order, requisition or account number according to standard operating procedures. 1.2. Customer is identified as a new or repeat customer.
2. Identify customer requirements	2.1. Customer requirements are identified from order or other verbal or written communication. 2.2. The degree to which customer requirements can be met is clearly communicated including details such as price, delivery date, quantity or quality. 2.3. Alternatives are proposed for any inability to completely satisfy customer requirements.

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ELEMENT	PERFORMANCE CRITERIA
3. Action customer requirements	3.1. Appropriate action to implement customer requirements is undertaken, for example by filling or entering of order, corrective action to resolve complaints, or repair or service to customer equipment. 3.2. Customer requirements not able to be met immediately are recorded, and follow-up checks are undertaken according to standard operating procedures.
4. Promote better customer service	4.1. Methods of improving customer service are identified and reported.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading, interpreting and following information on written job instructions, specifications and other applicable reference documents
- obtaining and checking customer identification details
- establishing rapport with the customer
- dealing with difficult or unsatisfied customers
- checking and clarifying information
- identifying and communicating the degree to which customer requirements can be met
- identifying alternative products and/or services
- taking appropriate action to meet customer requirements
- recording customer requirements including those not able to be immediately met
- following up unmet customer requirements
- reporting/recommending methods of improving customer service
- entering routine and familiar information onto proformas and standard workplace forms

Required knowledge

Look for evidence that confirms knowledge of:

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REQUIRED SKILLS AND KNOWLEDGE
• the procedures for identifying customers and defining customer relationships • service provision procedures for new/repeat customers • procedures for identifying customer requirements • the price of the required product or service • the quantities of the product available • the quality and characteristics of the product or service • the delivery date/requirements of the product or service • the procedures for informing the customer of the degree to which the customer's requirements can be met • the reasons for informing the customer promptly of the ability/inability to meet the customer's requirements • alternative products and/or services that may meet the customer's requirements • the procedures for actioning customer orders • the procedures for recording and managing customer complaints • the procedures for initiating repairs and/or service to customer equipment • the procedures for managing organisational errors in service provision • principles and practices of effective customer service • record keeping requirements of customer service interactions and transactions • the procedures for following up on unmet customer requirements • the procedures for reporting/recommending improvement to customer service • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to provide advanced customer service.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for	This unit may be assessed on the job, off the job or a

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EVIDENCE GUIDE	
assessment	combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with providing advanced customer service or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Customer relationship	• Internal or external • Repeat or one-off • New or established • Significance in terms of purchase size, length of association, company status, relationship • Previous history • Special service requirements or conditions • Reciprocal arrangements • Supply chain relationship
Methods of improving customer service	• New documentation • New communication • System improvements • Delivery improvements • Product or service improvements

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Communication

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MEM16005A Operate as a team member to conduct manufacturing, engineering or related activities

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers operating as a member of a team, where operations and outcomes are dependent on the performance of the entire team.

Application of the Unit

Application of the unit	This unit applies to a range of team activities that are carried out within a section of a manufacturing, engineering or a related work environment. Activities are interdependent in nature, with each team member providing a critical component of the output. Effective interaction and collaboration between team members is required in order to achieve team goals. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify team goals and processes	1.1. Team goals and requirements are identified. 1.2. Processes in place to assist in meeting team goals are identified. 1.3. Workflow and processes are described. 1.4. Roles and responsibilities of team members are identified. 1.5. Relationships within team and with other work areas are identified.
2. Communicate and cooperate with team members	2.1. Effective interpersonal skills are used to interact with team members and to contribute to activities and objectives. 2.2. Formal and informal forms of communication are used effectively to support team achievement. 2.3. Team members are assisted as required to ensure team achieves goals and requirements.

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ELEMENT	PERFORMANCE CRITERIA
	2.4. Diversity is respected and valued in team functioning. 2.5. Views and opinions of other team members are understood and reflected accurately. 2.6. Workplace terminology is used correctly to assist communication.
3. Work as a team member	3.1. Tasks are performed in accordance with organisational and team requirements, specifications and workplace procedures. 3.2. Agreed reporting lines are followed using standard operating procedures.
4. Solve problems as a team member	4.1. Potential and real problems faced by team are identified. 4.2. Procedures for avoiding and managing problems are identified. 4.3. Problems are solved effectively and in a manner which supports team functioning.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- contributing to achievement of team goals
- communicating and cooperating with team members
- coordinating work effort with others
- applying effective interpersonal skills
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- solving problems

Required knowledge

Look for evidence that confirms knowledge of:

- effective interpersonal strategies and skills:

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REQUIRED SKILLS AND KNOWLEDGE
• effective listening • basic speaking skills • use of terminology and jargon • giving and receiving feedback • checking and clarifying task-related information • interpreting instructions • basic conflict resolution • selecting modes and methods of communication • identifying and resolving communication breakdowns and barriers • principles of effective communication • relationships and roles within team and with others • reporting relationships and procedures • own responsibilities with respect to products/services to be provided by team • skills and competencies of the individual and other employees performing interdependent activities • team goals, objectives and task requirements • sources of technical expertise/assistance • appropriate forms of communication • hazards and control measures associated with team activities, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to operate in a work-based team environment.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

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EVIDENCE GUIDE	
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with operating in a work-based team environment or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and

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RANGE STATEMENT	
regional contexts) may also be included.	
Team goals	Production or manufacturing output, deadlines and timelines, resource use, performance, mistake elimination targets, process improvements, maintenance activity, safety levels
Effective interpersonal skills	Basic listening and speaking skills, use of terminology and jargon, giving and receiving feedback, interpreting instructions, verbal and non-verbal modes and methods of communication, communication breakdowns and barriers, basic principles of effective communication
Formal and informal forms of communication	Meetings, documentation, updates, handover, signage, discussion, explanations, demonstration, electronic
Diversity	Ethnicity, age, gender, demographics, disability
Workplace terminology	Terminology - referring to equipment, processes, workplace areas, staff and procedures - specific to the processes and equipment used in the workplace

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Communication

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MEM16006A Organise and communicate information

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers accessing, organising and communicating information related to processes or tasks.

Application of the Unit

Application of the unit	This unit applies in manufacturing, engineering or related environments. It may include information related to production, maintenance or associated processes. Information may be drawn from a variety of sources. This unit includes the ability to communicate using common workplace terminology. For access and recording of data requiring system knowledge and judgement, see Unit MEM16008A (Interact with computing technology). **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Access information and/or records	1.1. Information requirements of tasks are determined and relevant information is accessed from a range of sources. 1.2. Workplace terminology is correctly recognised.
2. Organise and analyse information	2.1. Information is interpreted and organised in accordance with enterprise and work requirements. 2.2. Information is analysed according to enterprise and work requirements.
3. Communicate organised information using established workplace methods	3.1. Information is communicated using established workplace methods.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • accessing relevant information from a range of sources • recording, where appropriate, the accessed information • recognising and using workplace terms • reading, interpreting and following information in workplace documentation • checking and clarifying information • organising, categorising and sequencing information
Required knowledge
Look for evidence that confirms knowledge of: • types of information • available sources of information • information analysis techniques • methods of categorising and organising information • methods of recording and communicating information

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to organise, analyse and communicate information.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency

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EVIDENCE GUIDE	
	in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with organising, analysing and communicating information or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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RANGE STATEMENT	
situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Range of sources	Job instructions, specifications, standard operating procedures, charts, lists, documents, computer data, drawings, sketches, tables, technical manuals and/or charts and other applicable reference material
Workplace terminology	Terminology - referring to equipment, processes, workplace areas, staff and procedures - specific to the processes and equipment used in the workplace
Analyse	Analysis for this unit involves simple determinations of relevance and implication for the employee's immediate work requirements
Established workplace methods	• Proforma reports • Data entry e.g. bar coding and simple keyboard operations • Verbal • Drawings

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Communication

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MEM16007A Work with others in a manufacturing, engineering or related environment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers operating in an interactive work environment. It covers contribution to a group effort in order to plan and carry out work. This includes identification of work roles, communication and cooperation with others.

Application of the Unit

Application of the unit	This unit applies to work-related group activities that typically occur in and between sections or departments of an enterprise. Employees would normally be working together to achieve a common purpose e.g. manufacture of a product, maintenance of plant and equipment. Individuals are not responsible for the overall group effort but would be required to contribute to activities and objectives using their own existing technical competencies. **Band**: **A** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify roles and responsibilities	1.1. Own role and responsibilities are identified. 1.2. Relationships within immediate group and with employees performing related/interdependent activities are identified.
2. Plan activities	2.1. Common goals, objectives and task requirements are identified and clarified with appropriate persons. 2.2. Individual tasks are determined and agreed on according to workplace procedures.
3. Work with others	3.1. Effective interpersonal skills are applied to interact with others and to contribute to activities and objectives. 3.2. Assigned or agreed tasks are performed in

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ELEMENT	PERFORMANCE CRITERIA
	accordance with agreed requirements, specifications and workplace procedures. 3.3. Work progress is reviewed and modified as agreed to complement the work of others. 3.4. Agreed reporting lines are followed using standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- contributing to planning and allocation of work
- performing assigned tasks
- coordinating work effort with others
- following agreed reporting lines
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- applying effective interpersonal skills

Required knowledge

Look for evidence that confirms knowledge of:

- effective interpersonal strategies and skills:
  - effective listening
  - basic speaking skills
  - use of terminology and jargon
  - giving and receiving feedback
  - checking and clarifying task-related information
  - interpreting instructions
  - basic conflict resolution
  - selecting modes and methods of communication
  - identifying and resolving communication breakdowns and barriers
  - principles of effective communication

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REQUIRED SKILLS AND KNOWLEDGE
• relationships and roles within immediate group and with interdependent others • reporting relationships and procedures • own responsibilities with respect to products/services to be provided • skills and competencies of the individual and other employees performing interdependent activities • common goals, objectives and task requirements • sources of technical expertise/assistance • appropriate forms of communication • hazards and control measures associated with workplace activities, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to operate in a work-based team environment.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated

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EVIDENCE GUIDE	
	with operating in a work-based team environment or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Effective interpersonal skills	Basic listening and speaking skills, use of terminology and jargon, giving and receiving feedback, interpreting instructions, verbal and non-verbal modes and methods of communication, communication breakdowns and barriers, basic principles of effective communication

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Communication

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MEM16008A Interact with computing technology

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers accessing, inputting and storing information used in manufacturing, engineering or related environments, using computing technology.

Application of the Unit

Application of the unit	This unit applies in manufacturing, engineering or related environments. It involves identifying the type and source of information required, and using the technology to access, input and store information. The equipment may include computers and a range of other equipment based on computing technology. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine job requirements	1.1. Nature and scope of task requirement are identified. 1.2. Information/data required to be accessed, input or stored is identified. 1.3. Source of information/data is identified.
2. Access information/data	2.1. Access procedures are followed. 2.2. Technology is navigated to find the required information/data. 2.3. Relevant software application menus, functions and commands are used to locate required information/data. 2.4. Information/data is retrieved using organisational procedures. 2.5. Information/data is checked for relevance to job requirements.
3. Input information/data	3.1. Relevant software menus, functions and commands are used to manipulate information/data. 3.2. Information/data is entered, changed, or removed as required.
4. Store	4.1. Data/files are saved following standard procedures

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ELEMENT	PERFORMANCE CRITERIA
information/data	prior to exiting the application. 4.2. Data output is produced as required. 4.3. Procedures for shutting down/logging off/exiting computing technology are followed.
5. Access assistance as required	5.1. Appropriate personnel are identified and consulted as required. 5.2. Manuals, online help and other reference materials are identified and used as required.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • ability to enter or retrieve data using appropriate software applications • reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • planning and sequencing operations • checking and clarifying task-related information • using numerical operations within the scope of this unit
Required knowledge
Look for evidence that confirms knowledge of: • functions and capabilities of various types of computing technology used in the workplace • functions of software applications • hazards and control measures associated with using computing technology, including housekeeping • safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to interact with computing technology to achieve workplace outcomes.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with interacting with computing technology or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for	

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EVIDENCE GUIDE	
assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Access procedures	Logging on and security procedures, virus checks, start-up routines, application start-up
Technology	Hand held data recording devices, screen based equipment, personal computers, bar coders
Applications	• Word processing spreadsheets and databases • Customised engineering and manufacturing applications • Material Resource Planning (MRP) • Warehousing inventory applications • Predictive reliability and maintenance applications • Production data management applications
Data output	Report, email, chart, graph, printout, data transfer, labels

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Communication

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MEM16009A Research and analyse engineering information

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers researching and analysing information and preparing the information for dissemination.

Application of the Unit

Application of the unit	In this unit, the employee may be researching and analysing engineering information for dissemination. Materials and documents mentioned are based on relevant knowledge of the employee competency level. **Band**: **B** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM16006A	Organise and communicate information
	MEM16012A	Interpret technical specifications and manuals

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Research information	1.1. Research requirements are identified and clarified with appropriate persons. 1.2. Sources of research data/information are identified and verified for currency and accuracy. 1.3. Information is compiled, recorded and stored using research techniques appropriate to the task requirements. 1.4. Information is sorted for relevance to research and analysis requirements. 1.5. Research is conducted within given timeframe, resource and quality constraints.
2. Analyse information	2.1. Scope, criteria and method for analysis are determined and verified, if necessary, with appropriate persons. 2.2. Information is accurately analysed according to established criteria. 2.3. Analysis is documented in an appropriate format according to workplace requirements.
3. Establish findings and conclusions	3.1. Findings are factual and accurately describe the results of the analysis 3.2. Conclusions are reached that are logical and based on objective analysis of available data.

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ELEMENT	PERFORMANCE CRITERIA
	3.3. Research data, analysis, findings and conclusions are verified, if necessary, with appropriate persons.
4. Summarise and organise technical data	4.1. Information is recorded in suitable form according to workplace requirements. 4.2. Information is summarised and organised for ease of reference, using established communication principles. 4.3. Information is disseminated to others according to workplace procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- questioning
- applying research techniques
- checking and clarifying information
- note-taking
- analysing information and data
- sorting and identifying relevant information/data
- establishing findings and conclusions based on analysis
- summarising and organising information and technical data
- preparing materials for dissemination to others
- planning and sequencing operations

Required knowledge

Look for evidence that confirms knowledge of:

- basic principles and methods of research and analysis
- effective communication principles with respect to research, analysis and organisation of technical data
- sources of research data/information

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REQUIRED SKILLS AND KNOWLEDGE
• use of internal/external databases • relevant personnel for consultation • relevant information/data • effect of variations in the information/data on the conclusions reached • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to research and analyse engineering information. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with researching and analysing engineering information or other units requiring the exercise of the skills and knowledge covered by this unit.

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EVIDENCE GUIDE	
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Research requirements	Purpose, expected outcomes, scope and nature, timeframe, required resources
Sources of research data/information	• Surveys • Interview • Observation • Test results • Data records • Reference books and journals • Technical manuals • Job histories • Internal/external databases
Research techniques	• Surveying/scanning • Skimming

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RANGE STATEMENT	
	• Questioning • Note-taking • Summarising • Relationship diagrams • Tabling
Communication principles	• Avoidance of ambiguity, redundancy, verbosity, circumlocution etc. • Use of headings • Logical ordering • Summarising • Layout • Customising material to audience • Use of graphics and tables

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Communication

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MEM16010A Write reports

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers writing technical or non-technical reports that include some level of analysis and/or research.

Application of the Unit

Application of the unit	The term report is used to denote any required written communication that goes beyond a simple recording of facts (such as completion of a pro forma shift production schedule) and which is based on a level of analysis and/or research. Where reports include technical information or details, then the writer would have the required technical knowledge/capability. Conclusions and/or recommendations where required are based on prior research or analysis of data. The analysis and conclusions should be consistent with the level of skill and knowledge of an employee working at that level. Simple analysis and research would be required. If data research and analysis is necessary to produce information for the report, Unit MEM16009A (Research and analyse engineering information should also be selected). For preparation of simple technical reports, see unit MEM16014A (Report technical information). **Band**: **B** **Unit Weight**: **2**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM14005A	Plan a complete activity

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify report requirements	1.1. Requirements for a written report are identified and confirmed with appropriate persons. 1.2. Information for the report is accessed according to workplace procedures. 1.3. Information is assessed for currency, accuracy and relevance for inclusion in the report.
2. Prepare and produce report	2.1. A structure and outline of the report are developed according to identified report requirements.

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ELEMENT	PERFORMANCE CRITERIA
	2.2. The report is written using terminology appropriate to the reader and established principles of report writing. 2.3. Findings and conclusions are based on factual analysis. 2.4. Recommendations, alternatives/suggestions are given, and supporting evidence supplied, where required. 2.5. Protocols, conventions and legal requirements related to acknowledgements and intellectual property are applied where necessary.
3. Finalise and distribute report	3.1. The report is checked for accuracy and edited as required. 3.2. The completed report is consistent with objectives and requirements. 3.3. The report is copied, distributed and stored according to instructions and workplace procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • following instructions • checking and clarifying information • sorting information/data • assessing information/data for relevance • using terminology and language appropriate to the target audience • structuring and writing reports • applying principles of report writing • presenting findings and conclusions based on factual analysis • making recommendations

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REQUIRED SKILLS AND KNOWLEDGE
• managing own time • planning and sequencing information • reviewing and editing
Required knowledge
Look for evidence that confirms knowledge of: • principles of report writing • report types and purposes • structure, style and parts of a report • use of language and expression in reports • common pitfalls, such as ambiguity, truisms, tautology, verbosity, circumlocution etc. • report numbering systems • techniques for reviewing and editing • importance and benefits of preparing reports appropriate for the intended audience • referencing and the importance of acknowledging sources • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to write reports. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must

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EVIDENCE GUIDE	
	be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with writing reports or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Requirements	Purpose, expected outcomes, scope and nature, timeframe, required resources
Report	• Reports types:

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RANGE STATEMENT	
	• accident/injury • equipment report • memo and letter reports • information report • analytical report • Report structure: • title page • table of contents • summary • introduction • body (findings and conclusions) • recommendations • references • appendices • glossary • Report content: • text • graphs • charts • tables • diagrams
Principles of report writing	• Use of headings, subheadings, sectioning and numbering • Objectivity • Expression • Language and grammar • Sentence and paragraph structure • Logical ordering and sequencing • Summarising and editing • Layout and spacing • Content relevancy • Use of graphics, charts, tables, illustrations etc.

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Communication

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MEM16011A Communicate with individuals and small groups

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers communicating effectively across a range of communication networks in the workplace. Communication levels include interpersonal (one-to-one), person-to-group, and mediated (e.g. telephone, letter, memo).

Application of the Unit

Application of the unit	This unit applies where an individual is required to undertake a broad range of communication activities within a manufacturing or engineering organisation. The person would regularly use a variety of communication channels and media to communicate with others. To satisfy this unit, the person would need to exercise skills in verbal and non-verbal communication, along with demonstrating an understanding of communication principles and processes. Applications include common workplace activities such as facilitating small group discussions and meetings, writing memos or letters, making telephone calls, counselling co-workers, resolving issues or routine conflicts, talks or speeches. This unit includes written communication by letter, short memorandum or report etc. If research and/or structured report writing is required, Unit MEM16009A (Write reports) and/or Unit MEM16009A (Research and analyse engineering information) should be selected. **Band**: This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band

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	B unit for progression to C5 (AQF level V). **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM16006A	Organise and communicate information

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Plan and prepare	1.1. Communication types and networks within the

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ELEMENT	PERFORMANCE CRITERIA
communication	enterprise are identified. 1.2. Enterprise conventions, policies and procedures are followed when planning and preparing communication activities. 1.3. Communication channels and codes appropriate to objectives, circumstances and receiver/s are selected. 1.4. Communication is planned and structured to promote the accurate transfer of meaning. 1.5. Communication setting and climate is established appropriate to purpose and content of message. 1.6. Required resources are prepared and or obtained.
2. Communicate effectively in interpersonal, mediated and group settings	2.1. Effective communication skills, strategies and principles are applied to a variety of communication events. 2.2. Verbal and non-verbal language is used appropriate to the topic, sensitivities and technical understanding of the person/s being addressed. 2.3. Individual differences are respected and considered. 2.4. Purpose and objectives of communication are adhered to. 2.5. Participation in communication is encouraged. 2.6. Conventions, rules, policies and procedures are followed.
3. Evaluate communication	3.1. Feedback regarding the effectiveness of the communication activity is obtained. 3.2. Outcomes are assessed against communication objectives and selected channels and codes. 3.3. Communication barriers are identified and strategies for overcoming them are identified and implemented.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE
Look for evidence that confirms skills in: • selecting and using various communication channels • coding and decoding verbal and non-verbal messages • giving and receiving feedback • identifying blockages, barriers and breakdowns in communication • applying principles of effective communication • applying speaking and listening skills to interpersonal and group situations • using writing skills to communicate technical and non-technical information using common verbal written channels • undertaking reading and comprehension of written workplace communications
Required knowledge
Look for evidence that confirms knowledge of: • communication process, stages and roles • communication types and networks • verbal and non-verbal channels - advantages and disadvantages • verbal and non-verbal codes - advantages and disadvantages • principles, strategies and conventions for interpersonal, mediated and group communication • communication skills for sender and receiver • communication blockages, barriers and breakdowns and strategies for overcoming them • individual differences between communicators and strategies for effective communication • establishing communication climate

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to communicate across a range of environments using different methods and techniques appropriate to the content and purpose of the communication. Competency

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EVIDENCE GUIDE	
	in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with complex communication or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Communication types	• Upward - examples: reporting, suggestions, grievances • Downward - examples: policy, procedure, job instruction, feedback, information • Horizontal - examples: task coordination, conflict resolution, discussion, problem solving, information sharing
Communication networks	• Hierarchies, patterns or clusters of personnel • Enterprise conventions, protocols and procedures for communication
Communication channels and codes	• Channels - defined here as the route a message takes through any of the three broad media: written verbal, spoken verbal and non-verbal • verbal channels involve visual and sound media. • non-verbal channels may involve visual, sound, touch, taste and smell and combinations of these • Codes - defined here as any system of language, symbols, signals, gestures etc. that gives mutual meaning to a message. Codes may be: • verbal (spoken or written language) • non-verbal e.g. symbols and emblems, body language
Effective communication skills, strategies and principles	• Questioning and clarifying • Speaking and conversation skills • Effective and active listening • Reading and comprehension skills • Giving and receiving feedback • Giving and interpreting verbal and non-verbal messages • Using the telephone and similar mediated channels

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RANGE STATEMENT	
	• Establishing communication climate • Basic conflict resolution • Seeking and acknowledging contribution • Agreeing on communication protocols • Clarifying the purpose of the communication activity • Principles and protocols for informal and formal meetings • Principles and protocols for speaking to a group • Group discussion strategies, principles and protocols • Interpersonal strategies and principles
Communication events	• Letters, memos, emails etc. • Telephone calls • Group talk • Meetings • Individual and group discussion • Task coordination • Information sharing
Individual differences	• Age, sex, ethnic origin, language • Status in the organisation • Level of expertise

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Communication

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MEM16012A Interpret technical specifications and manuals

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers identifying, accessing, interpreting and analysing technical information in an enterprise, including quality documentation, equipment manufacturer specifications, engineering data sheets and national standards. It also covers explaining and using the information, and identifying implications of changes to technical information.

Application of the Unit

Application of the unit	This unit goes beyond routine accessing and interpretation of technical information. This unit applies to the identification, access, interpretation and analysis of technical information to enable carrying out engineering or manufacturing activities. For routine accessing, organising and communication of information related to processes or tasks, MEM16006A Organise and communicate information should be regarded as sufficient. **Band**: **B** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify and locate technical information resources	1.1. Information needs are identified and confirmed with appropriate persons. 1.2. Workplace information resources are identified and their location is determined in the information system. 1.3. Appropriate technical information is obtained.
2. Access technical information	2.1. Relevant technical information is located using search techniques appropriate to the resource and information requirements. 2.2. Symbols, codes, legends, and abbreviations are interpreted correctly. 2.3. Technical information is accessed and relevant

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ELEMENT	PERFORMANCE CRITERIA
	application is understood. 2.4. Clarification or further explanation of technical information is obtained, where required. 2.5. If applicable, the revision status of the technical information is verified to ensure current status.
3. Interpret and analyse technical information	3.1. Technical information/data appropriate to work requirements and/or application is checked for currency and authenticity. 3.2. Technical information is interpreted and analysed for use in given engineering or manufacturing applications. 3.3. Technical information is used according to the specific engineering or manufacturing application.
4. Explain and use information	4.1. Information and analyses is explained and distributed to appropriate personnel. 4.2. Information resources are used according to work requirements. 4.3. Where applicable, work is undertaken in accordance with acquired technical information.
5. Identify implications of changes to technical information	5.1. Technical information systems are monitored for changes. 5.2. Personnel affected by changes to internal or external specifications or other technical information are identified. 5.3. Means of distributing changed information are established. 5.4. Changes to technical information are documented according to enterprise procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • accessing, reading and following information on written job instructions,

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REQUIRED SKILLS AND KNOWLEDGE
specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • planning, sequencing operations • following oral/written instructions • checking and clarifying task-related information • checking for conformance to specifications • undertaking numerical operations and calculations/formulae within the scope of this unit • entering information onto workplace documents • accessing and using technical documentation • identifying and using correct specifications for process and/or systems • using components of system, where appropriate • completing formal documentation and reporting as required • adopting appropriate communication strategy, including confirmation of received information and distribution of instructions • communicating information in ways appropriate for the audience • maintaining appropriate records • identifying and analysing implications of changes to information systems
Required knowledge
Look for evidence that confirms knowledge of: • available industry information resources • uses and applications of information resources • range of formats that information can be presented • safe work practices and procedures • location and retrieval requirements of system information • correct process used to identify relevant specifications • quality improvement processes for information systems • interpretation of technical data and information • appropriate communication strategies • dissemination of information regarding information systems • a range of instructional techniques • implications of changes to technical information • procedures for responding to information changes • hazards and control measures associated with changes to technical information, including housekeeping • safe workplace practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to interpret and analyse information from specifications and manuals.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with interpreting and analysing information from specifications and manuals or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for	

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EVIDENCE GUIDE	
assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Information resources	Documented management system (manufacturing, quality, environmental, occupational health and safety), manufacturers' manuals, specifications, Australian and international standards, customer requirements, industry manuals, codes of practice, legislation etc. in hard and soft copy
Location	Reference libraries, workplace storage areas, internet, site
Information system	Internal and/or external. The system would typically have documentation tiers
Technical information	Technical information and data suitable and appropriate for advanced trade and technician applications within the enterprise. This unit does not cover documentation written for professional engineering or scientist applications
Search techniques	• Computer database and internet search/look-up • Standard techniques to identify relevant information including skimming and scanning, identifying key words/ideas, using index, table of contents, numbering and classification systems etc.
Analyses	Conclusions made from the analysis of technical information

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Communication

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MEM16013A Operate in a self-directed team

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers an individual effectively participating in a highly developed and self-directed team.

Application of the Unit

Application of the unit	This unit applies to participation in a formally established, developed or developing self-directed team. Examples are engineering production teams responsible for a product or process, maintenance teams and special-purpose project teams. Typically, team parameters, constraints and objectives would be determined by sources external to the team. The team would be responsible for all aspects of its designated function and members would have day-to-day responsibility for managing themselves and their work. Typical team tasks might include planning and scheduling activities, making production-related decisions and acting on problems. Where team parameters require adjustment as a result of team discussions or planning, then appropriate authorisation and approvals are established using standard operating procedures. Individual team participants would already be competent with technical aspects of team activities. This unit is intended to apply to participation within a formally established and recognised team. Where an individual works with others, such as within a section or department, unit MEM16007A (Work with others in a manufacturing, engineering or related environment) should be regarded as sufficient. This unit may be included in a Certificate II in

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	Engineering - Production Technology or higher qualification. **Band**: This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C5 (AQF level V). **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM16007A	Work with others in a manufacturing, engineering or related environment

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent

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	with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify team function and composition	1.1. Team purpose and scope are identified and understood. 1.2. Team composition, including role of self and team members, is understood. 1.3. Established parameters, rules and team norms are identified and understood.
2. Participate in team planning	2.1. Significant contribution is made to planning the team activities, based on the individual's technical skills, knowledge and competence. 2.2. Contribution is made to the allocation and performance of team tasks.
3. Function effectively as a team member	3.1. Interaction with team members is in accordance with established rules, conventions and procedures. 3.2. Tasks and responsibilities are performed effectively and in accordance with team objectives. 3.3. Real or perceived issues are resolved by effective and appropriate contributions from team member. 3.4. Significant contribution is made to team performance, based on member's own technical skills and application of established principles and practices for effective teamwork.
4. Monitor and review team performance	4.1. The team member participates effectively in the planning and development of team review process. 4.2. Relevant performance data is collected and analysed on an individual and team basis using standard enterprise procedures and methodology. 4.3. Results are used to evaluate own and team performance against established performance indicators and to assist determination of improvement requirements. 4.4. Principles/techniques for effective team development are used to identify own/team improvement strategies.
5. Implement team performance	5.1. Performance improvement processes and strategies are implemented on an individual and collective basis

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ELEMENT	PERFORMANCE CRITERIA
improvements	using standard enterprise procedures. 5.2. Individual and team performance improvements are evaluated using standard enterprise procedures. 5.3. Adjustments to improvement strategies are made in accordance with team requirements and standard enterprise procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- identifying team goals and objectives
- participating in team planning - shared and individual
- allocating tasks and sequencing activities
- communicating and interacting effectively with team members
- solving problems individually and with others
- resolving conflict
- performing various team behavioural functions - task and maintenance focused
- making individual and joint decisions
- coordinating effort with others to achieve common objectives
- collecting team performance data
- reviewing performance against indicators
- identifying strategies to improve team performance
- implementing performance improvement processes
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- checking and clarifying task-related information
- checking for conformance to specifications

Required knowledge

Look for evidence that confirms knowledge of:

- team objectives
- team targets/goals, performance indicators

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REQUIRED SKILLS AND KNOWLEDGE
• team member roles - task and behavioural • team processes, rules and conventions • scope of work for which the team is responsible • methods for planning team activities • team member technical skills, knowledge and competence, relevant to the tasks being planned • the person(s) responsible for team planning • impact of planning decisions on other teams, personnel and/or resources • procedures for obtaining resources • structure, formation and operation of teams • characteristics of effective teams • strategies for effective team development/functioning • effective team communication • forms of team leadership and decision-making • strategies for resolving conflict • techniques for team problem-solving • issues that may affect team performance • the sources of data relevant team performance indicators • reasons for reviewing team performance • methods/procedures to evaluate team performance • where appropriate, source(s) of approval to change team performance parameters • processes/strategies for improving team performance • hazards and control measures associated with operating in a self-directed team environment, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to operate within a self-directed team. Competency in this unit cannot be claimed until all prerequisites have been satisfied.

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with operating within a self-directed team or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Team	• A highly developed and cohesive work group in which the individuals have a common aim, and in which the jobs and skills of each member fit in with those of others • Team members manage day-to-day activities within operating parameters and constraints • The team is typically characterised by interdependent and complementary effort, high cohesion and culture, conjunctive tasks, effective use of team resources and a focus on continuous improvement • The team may have a single leader or shared leadership
Principles and practices for effective teamwork	Relating to: • goals • problem solving • resolving conflict • team leadership • team decision making • team rules and norms • team roles and behaviours • team maintenance

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Communication

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MEM17001B Assist in development and deliver training in the workplace

Modification History

Single band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit covers planning for and delivering on the job training, and reviewing the training program. Training, which may structured or informal, is delivered in a one-to-one or small group situation.

Application of the Unit

Application of the unit	Training is delivered in a one-to-one or small group situation. The training may be structured or informal and based on cooperation between trainer and other training personnel. Both underpinning knowledge and practical skills are covered by the training. Training may be applied to technical, induction, OHS or other areas. Normal supervision of an apprentice is covered by Unit MEM17003A (Assist in the provision of on the job training). This unit does not cover assessment. Assessor skills are covered in Unit MEM17002B (Conduct workplace assessment). **Band:** This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C5 (AQF level V). **Unit Weight**: **2**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Plan for delivery of on the job training	1.1. Objectives of training and competency to be achieved are identified. 1.2. Role in provision of training is clarified.
2. Deliver on the job training	2.1. Training objectives are explained to trainee. 2.2. Training is carried out using appropriate techniques: logical presentation; sound communication methods; explanation, demonstration; practice; feedback. 2.3. Trainee progress is monitored and constructive

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ELEMENT	PERFORMANCE CRITERIA
	feedback is provided to trainee.
3. Review training program	3.1. Training program is evaluated according to standard operating procedures. 3.2. Training data is recorded according to standard operating procedures. 3.3. Training is reported according to standard operating procedures. 3.4. Training is promoted according to standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • communicating effectively with the trainee • applying training techniques appropriate to the trainee and training requirements • giving feedback • monitoring and recording trainee progress • evaluating training program • recording training data • completing reports on training completed and training required • promoting training within the workplace
Required knowledge
Look for evidence that confirms knowledge of: • competencies to be achieved through the training • role of the trainer in the provision of training • training techniques to be used in delivering the training • reasons for selecting the chosen training techniques • procedures for recording trainee progress • reasons for providing positive feedback • procedures for evaluating training programs • reasons for evaluating training programs

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REQUIRED SKILLS AND KNOWLEDGE
• training records to be kept • procedures for recording training data • procedures for preparing training reports • procedures for promoting training in the workplace • reasons for promoting training in the workplace

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to assist in development and delivery of training in the workplace.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with assisting in the development and delivery of training in the workplace or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be

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EVIDENCE GUIDE	
	gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Objectives of training	Achieve effective and safe operation of equipment, induction to organisational practices and procedures, continuous improvement, provision of technical information
On the job training	Logical presentation; sound communication methods; explanation, demonstration; practice; feedback

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Training

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MEM17003A Assist in the provision of on the job training

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers assisting in the provision of on the job training to others while undertaking normal duties.

Application of the Unit

Application of the unit	This unit may involve the replacement of normal duties with training duties for limited periods of time. The individual would not be expected to be solely responsible for the assessment or reporting of a trainee's progress. Typical applications could include the provision of on the job guidance by a tradesperson to apprentices/trainees or by a production worker to other production workers/trainees. Where development of training programs is involved see Unit MEM17001B (Assist in development and deliver training in the workplace). **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine role of on the job training	1.1. Objectives of training and role of on the job training are identified in consultation with team leaders or other appropriate personnel.
2. Provide on the job training	2.1. Training is conducted using learning methods appropriate to the training objectives and learner. 2.2. Trainee progress is monitored and feedback is provided appropriate to the learning outcomes.
3. Report on trainee performance	3.1. Trainee's progress is reported according to standard operating procedure.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- obtaining all relevant information with respect to the training to be provided
- applying suitable training methods
- providing feedback to the trainee throughout the training process
- reporting on the trainee's progress
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying task-related information

Required knowledge

Look for evidence that confirms knowledge of:

- training to be delivered
- personnel to be consulted with respect to the training to be provided
- the individual's role in the provision of training
- objectives of the training
- the person(s) to be trained
- procedures to be followed when training individuals
- training location(s)
- tools, equipment, procedures, materials and resources
- training delivery methods, their applications, advantages and disadvantages
- feedback techniques
- reasons for monitoring trainee progress
- reporting procedures
- hazards and control measures associated with assisting in the provision of on the job training, including housekeeping
- safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to assist in the provision of on the job training.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with assisting in the provision of on the job training or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Learning methods	Explanation, demonstration, simulation
Report	Should include information about the skills satisfactorily achieved and those where further practice is required

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Training

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MEM18001C Use hand tools

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers using a range of hand tools for a variety of general engineering applications.

Application of the Unit

Application of the unit	Applications may include hand tools used for adjusting, dismantling, assembling and finishing of items or components, and the finishing, cutting, scraping of metallic and non-metallic material to size and shape. This includes simple tapping and threading and routine maintenance of hand tools. This unit should not be selected if the hand tool is dedicated to a single operation or machine and if only a machine specific/customised tool is used. When using hand held power tools or power tools used for hand held operations, refer to Unit MEM18002B (Use power tools/hand held operations). **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Use hand tools	1.1. Hand tools are selected appropriate to the task requirements. 1.2. Hand tools are used to produce desired outcomes to job specifications which may include finish, tension, size or shape. 1.3. All safety requirements are adhered to before, during and after use. 1.4. Unsafe or faulty tools are identified and marked for repair according to designated procedures before, during and after use. 1.5. Routine maintenance of tools, including hand sharpening is undertaken according to standard

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ELEMENT	PERFORMANCE CRITERIA
	operational procedures, principles and techniques. 1.6. Hand tools are stored safely in appropriate location according to standard operational procedures and manufacturers' recommendations.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading and following information on standard operating procedures • following verbal instructions • selecting hand tools appropriate to the task • using hand tools safely • identifying hand tool defects and marking for repair • maintaining/sharpening hand tools using appropriate techniques • storing hand tools in accordance with manufacturers'/standard operating procedures
Required knowledge
Look for evidence that confirms knowledge of: • applications of different hand tools in a general engineering context • common faults and/or defects in hand tools • procedures for marking unsafe or faulty tools for repair • routine maintenance requirements for a range of hand tools • storage location and procedures for a range of hand tools • hazards and control measures associated with using hand tools • use and application of personal protective equipment • safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to use hand tools for a range of general engineering applications.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using hand tools or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Hand tools	Hacksaws, hammers, punches, screwdrivers, sockets, wrenches, scrapers, chisels, gouges, wood planes and files of all cross-sectional shapes and types
Job specifications	Finish, tension, size or shape etc.
Routine maintenance	Cleaning, lubricating, tightening, simple tool repairs, hand sharpening and adjustments using engineering principles, tools, equipment and procedures

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Maintenance and diagnostics

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MEM18002B Use power tools/hand held operations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers using a range of hand held power tools and fixed power tools for hand held operations for a variety of general engineering applications.

Application of the Unit

Application of the unit	This unit applies to loosening and fastening items or components and shaping, finishing, cutting, grinding metallic and non-metallic materials and/or tool bits to size and shape. This unit should not be selected if the power tools used are dedicated to an operation or machine, e.g. nut-runner, air drill, power driver, etc. For using hand tools, see Unit MEM18001C (Use hand tools). **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Use power tools	1.1. Power tools are selected appropriate to the task requirements. 1.2. Power tools are used for a determined sequence of operations - which may include clamping, alignment and adjustment to produce desired outcomes - to job specifications which may include finish, size or shape. 1.3. All safety requirements are adhered to before, during and after use. 1.4. Unsafe or faulty tools are identified and marked for repair before, during and after use according to designated procedures. 1.5. Operational maintenance of tools, including hand sharpening, is undertaken according to standard

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ELEMENT	PERFORMANCE CRITERIA
	workplace procedures, principles and techniques. 1.6. Power tools are stored safely in appropriate location according to standard workshop procedures and manufacturers' recommendations.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading and following information on standard operating procedures • following verbal instructions • selecting power tools appropriate to the task • using power tools safely • using clamping/securing devices • identifying power tool defects • maintaining power tools using appropriate techniques • sharpening tools/tool bits within the scope of this unit • storing power tools according to manufacturers'/ standard operating procedures.
Required knowledge
Look for evidence that confirms knowledge of: • application of different power tools • clamping/securing methods • adjustments/alignments to a range of power tools • common faults and/or defects in power tools • procedures for marking unsafe or faulty power tools for repair • routine maintenance requirements of a range of power tools • tool sharpening techniques for a range of power tools • storage location and procedures of a range of power tools • hazards/control measures associated with power tools • use and application of personal protective equipment • safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to use power tools/hand held operations.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using power tools/hand held operations or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Power tools	Electric or pneumatic/hydraulic drills, grinders, jigsaws, nibblers, cutting saws, sanders, planers, routers, pedestal drills and pedestal grinders
Clamping	Multigrips, vices, jigs and fixtures, clamps etc.
Job specifications	Finish, size or shape etc.
Operational maintenance	Hand sharpening, cleaning, lubricating, tightening Simple tool repairs and adjustments using engineering principles, tools, equipment and procedures to statutory and regulatory requirements

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18003C Use tools for precision work

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers using tools to manually produce work to precise dimensions and or finishes.

Application of the Unit

Application of the unit	Work is undertaken autonomously or in a team environment, using predetermined standards of quality, safety and workshop procedures. This unit involves using a variety of tools, instruments and power equipment to perform precision tasks on a range of metallic and non-metallic materials. As a guide, the types of precision work covered by this unit could include: • scraping machine beds to precise tolerances • broaching a tapered keyway • hand reaming the bore of a spigot or bush to a positive transition fit with shaft • core drilling (finishing) a blind locating hole to receive a mating pin • lapping a mechanical seal to fine finish • filing complex angles and mating edges • precision grinding using flex-drive attachment or similar Inspection and preventative maintenance of tools and equipment involves the visual checking of leads and connections, sharpening of cutting equipment and the repair of associated tools. Where precision measurement is required, Unit MEM12003B (Perform precision mechanical measurement) should also be selected. Where precision marking out is required, Unit

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	MEM12006C (Mark off/out [general engineering]) should also be selected. Where specifications are interpreted from engineering drawings, detailed/technical sketches and associated documents, Unit MEM09002B (Interpret technical drawing) should also be selected. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range

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	statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine job requirements	1.1. Task requirements and specifications are determined and clarified with appropriate persons. 1.2. Processes/techniques are selected appropriate to task, specifications and material.
2. Prepare tools and tooling to produce precision outcome	2.1. Tools, accessories and consumables are selected appropriate to task, specifications and material. 2.2. Where applicable, cutting tool modifications required to produce outcome are determined using engineering principles. 2.3. Tools/tooling are prepared and modified as required.
3. Use tools to produce work to precise specifications	3.1. The work area is prepared and made safe. 3.2. The work piece is prepared and secured using appropriate method for selected operation/s. 3.3. Tools are used according to acceptable engineering principles, methods, applications and procedures to produce specified outcome to the required accuracy. 3.4. Tools and equipment are inspected for safe and proper working order before, during and after use. 3.5. Unserviceable tools/equipment are identified, repaired where appropriate, or marked for repair and/or disposal, according to prescribed procedure. 3.6. Tools are stored and maintained to ensure serviceability.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE

Look for evidence that confirms skills in:

- obtaining and interpreting relevant drawings, specifications, instructions etc.
- preparing and making safe the work area(s) prior to the work being carried out
- using appropriate tools to produce the specified outcomes
- checking tools and equipment for safe and proper working order before, during and after use
- where appropriate, marking unsafe or faulty tools and equipment for repair
- where appropriate, repairing/maintaining unsafe or faulty tools
- checking condition of all tools and equipment for conformance to specifications and safe and proper operation prior to storage
- safely storing all tools and equipment in the appropriate location

Required knowledge

Look for evidence that confirms knowledge of:

- work to be undertaken
- specifications to be achieved
- appropriate tools, processes and equipment required to carry out the work to the required specifications
- reasons for selecting the chosen tools, processes and equipment
- hazards and control measures associated with using the selected tools, processes and equipment, including housekeeping
- safety procedures to be followed to ensure the safety of the individual and other personnel
- procedures for using the selected tools
- engineering principles to be applied during the use of the tools
- manufacturers' specifications of the tools and equipment selected
- safe and proper function of tools and equipment selected
- procedures for checking tools and equipment for correct and safe operation
- common faults and/or defects in tools and equipment used/selected
- procedures for marking unsafe or faulty tools and equipment for repair
- repairs/operational maintenance that can be made to the tools and equipment used/selected
- procedures for repairing/maintaining the tools and equipment used/selected
- procedures for checking tools and equipment prior to storage
- storage location of the tools and equipment used/selected
- procedures for storing tools and equipment used/selected

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to use tools to fashion or shape work to high levels of precision for dimension and or finish to specifications. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using tools for precision work or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Processes	• Hand tools and hand held power tools are used to fashion or shape work to high levels of precision for dimension and or finish to specifications • Engineering techniques, methods and procedures may include cutting out, drilling, fitting, filing, reaming, lapping, broaching, burnishing, scraping, polishing, hand held grinding, chiselling
Precision outcomes	Specified tolerances, allowances, fits, finishes, alignments
Tools	Any tools or equipment required to achieve precision outcomes
Tool modifications	Tool shape, rake angle and clearance angles

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18006C Repair and fit engineering components

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers mechanical repair and fitting trade skills including fault finding, repair of faulty components, manufacturing of new parts/components, and fitting mechanical engineering components into assemblies or sub-assemblies to specified measurements and tolerances and consistency with manufacturer's specification. Repair and fitting of engineering components is undertaken using mechanical engineering and maintenance principles, designated procedures, correct and appropriate tools/equipment, and safe working practices.

Application of the Unit

Application of the unit	This unit of competency applies to repair and fitting work undertaken by a tradesperson in a mechanical maintenance, service or workshop environment. Work is undertaken autonomously or as part of a team using predetermined standards of quality, safety and workshop procedures. Skills covered include determining the need for repair or replacement of parts and assemblies, and undertaking of repair, replacement, assembly and final fitting of items, sub-assemblies and assemblies. All specifications are interpreted from engineering drawings, detailed/technical sketches and associated data sheets. The unit includes the use of appropriate workshop practices. New components are manufactured as required to specifications. This unit has been developed for Engineering Tradesperson - Mechanical apprenticeship training and the recognition of trade level skills in repair and fitting of engineering components. Skills covered by this unit are generally applied in occupational and work situations

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	associated with trade level fitting and machining work. It may also apply to other mechanical trade occupational areas requiring high level repair and fit of engineering component skills. This unit has application in the MEM30205 Certificate III in Engineering - Mechanical qualification and other qualifications requiring a trade level of repair and fit skills. This unit does not address machining competencies and welding, if these are required, the appropriate units should also be accessed. Where additional or higher marking out skills are required, refer to MEM12006C Mark off/out (general engineering). The knowledge and skills associated with the installation, removal, repair or replacement of mechanical seals is covered by MEM18012B Perform installation and removal of mechanical seals. For high pressure fluid power seals, refer to MEM18020B Maintain hydraulic system components. **Band**: **A** **Unit Weight**: **6**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18003C	Use tools for precision work

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Prerequisite units		
	MEM18055B	Dismantle, replace and assemble engineering components

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify scope of repair and/or fit required	1.1. Operational specifications for components are obtained from appropriate source and are interpreted and understood 1.2. Operation and condition of components are assessed against specifications 1.3. Faulty/worn components are identified 1.4. Causes of faults are determined using appropriate engineering principles, techniques, procedures, tools and equipment 1.5. Repair, replacement, adjustment or manufacture requirements are determined
2. Repair/replace faulty components	2.1. Where applicable, appropriate method of repair is determined 2.2. Where applicable, faulty components are repaired or

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ELEMENT	PERFORMANCE CRITERIA
	adjusted to conform to specifications 2.3. Where applicable, replacement parts are selected from manufacturers' catalogues and assessed against specifications
3. Manufacture parts/components	3.1. Parts/component specifications are determined from appropriate source 3.2. Materials are selected to meet specification requirements 3.3. New components are produced in conformance to specifications using appropriate workshop practices 3.4. Completed components are inspected for compliance with dimensions 3.5. Where appropriate, component parts are marked for identification prior to assembly
4. Fit engineering components into assemblies or sub-assemblies	4.1. Fitting requirements and sequence of assembly are determined 4.2. Appropriate fitting principles and techniques are applied in the preparation and assembly of component parts using fastening equipment and methods which ensures conformance to specifications, operational performance, quality and safety 4.3. Using acceptable engineering practices, correct gland packing, jointing/gasket materials are selected and applied correctly in conformance to specifications and operational requirements 4.4. Correct lubrication requirements are determined by appropriate means and attended to where applicable 4.5. Final adjustments are performed on component assembly to meet operational specifications using acceptable engineering principles, fitting techniques and procedures
5. Check operation of repaired components/unit	5.1. Components/unit are checked under operational conditions for compliance to operational specifications using acceptable engineering principles to standard operating procedures 5.2. Out of specification modification/alterations are approved by appropriate authority and are recorded and documented to standard operating procedures 5.3. Final component assembly is commissioned and returned to service according to standard operating procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- obtaining operational specifications for the components
- assessing operation against specification and identifying faults
- checking components visually and dimensionally against the operational specifications using work site procedures
- checking repaired components visually and dimensionally for conformance to specifications
- adjusting components to achieve conformance to specifications where appropriate
- selecting replacement parts which conform to specifications
- preparing and assembling components using appropriate fitting techniques and principles
- where appropriate, applying gland packing, jointing or gasket materials, using acceptable engineering practices
- applying appropriate lubricants to the assembly using acceptable engineering practices, where required
- checking components for conformance to specification
- where required, adjusting components to achieve conformance to specifications
- where required, recording any approved modifications/alterations to work site procedures
- inspecting the final assembly and checking conformance to operational specifications
- where appropriate, returning the final assembly to service in accordance with work site procedures
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Required knowledge includes:

- tools and equipment to be used to dismantle the components
- consequences of having components that do not comply with operational

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REQUIRED SKILLS AND KNOWLEDGE
specifications • types of adjustment applicable to the components being repaired/fitted • appropriate methods of repair • features and/or dimensions upon which replacement parts are to be selected • process of identifying replacement parts from third party suppliers' catalogues • material properties required • manufacturing operations to be used in the production of new components • sequence of operations to be used in the production of new components • fitting requirements for assembling components • appropriate sequence of assembly tasks • purpose of using gland packing, jointing or gasket materials • reasons for selecting particular jointing or packing materials • applications of different types of lubricants • consequences of using inappropriate or no lubricant • the need to have approval for out of specification modifications • reasons for documenting out of specification modifications • return to service procedures • consequences of not following work site return to service procedures • hazard and control measures associated with repairing and fitting engineering components, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to repair and fit engineering components to specifications in both workshop and site environments. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence

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EVIDENCE GUIDE	
	include: • obtaining manufacturer's and enterprise specifications for equipment, materials and components • checking components visually and dimensionally in the workplace including tolerances, allowances, clearances and limits • repairing and fitting components and assemblies in a workshop environment to required specifications • repairing and fitting components and assemblies in a production or other work site environment • manufacturing and fitting components including commissioning and return to service checking of component and equipment through first off production or other recognised return to service checking procedure • procedures for out of specification modification/alterations.
Context of and specific resources for assessment	This unit has been developed to support training in and recognition of trade level competency repair and fit of engineering components as applied to a trade level fitting and machining work environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.
Method of assessment	Typically, persons engaged in Engineering Tradesperson - Mechanical work are required to apply their repair and fit skills and techniques across a range of jobs and specifications. A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct

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EVIDENCE GUIDE	
	observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials
Guidance information for assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with repair and fit of engineering components or other units requiring the exercise of the skills and knowledge covered by this unit. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Manufacturers' catalogues	Manufacturers' catalogues may include any appropriate manufacturers' catalogues that contain replacement parts that conform with specifications and operational requirements
Appropriate workshop practices	Appropriate workshop practices may include: • drilling • scraping

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RANGE STATEMENT	
	• filing • reaming • tapping • threading
Fitting principles and techniques	Fitting principles and techniques may include: • limits of tolerance • allowances and clearances • effects of wear, stress, temperature • types of fits - clearance transition interference • press fitting methods • force fits • shrink and freeze (expansion) fits • keyed fits • taper fits • lateral and radial forces • backlash • configuration and mating of parts • applied use of precision tools and measuring equipment • engineering components - shafts, single and multi-throw crankshafts, cams and journals, bearings and bearing surfaces, keys • squareness, roundness, concentricity, flatness, straightness, surface finish and angular correctness • datum and centrelines • tapping, reaming and broaching

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units	

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Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18010C Perform equipment condition monitoring and recording

Modification History

Single band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit covers undertaking condition monitoring.

Application of the Unit

Application of the unit	This unit applies where specialist monitoring activities are undertaken as part of a preventive maintenance or total productive maintenance plan or program. Work is undertaken autonomously or as part of a team environment. Monitoring is undertaken in workshop, laboratory or in situ environment; readings are undertaken to the accuracy of monitoring equipment limitations or to site specifications where applicable. Results are recorded/plotted to predetermined procedure and technique. All work and work procedures are undertaken to standard operating procedures and/or equipment manufacturers' recommendations. All work and work practices are undertaken to regulatory or legislative requirements. Where only routine maintenance checking and diagnostic skills are applied, other appropriate units should be accessed. **Band:** This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C5 (AQF level V). **Unit Weight**: **4**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18055B	Dismantle, replace and assemble engineering components

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Undertake condition	1.1. Principles and methods of equipment condition

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ELEMENT	PERFORMANCE CRITERIA
monitoring	monitoring are understood and applied 1.2. Appropriate condition monitoring technique is selected to achieve required outcomes. 1.3. Checks are undertaken correctly, safely and to standard operating procedures. 1.4. Results are plotted and deviations from specification are reported to appropriate authority and recorded.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading, interpreting and following information on job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • planning and sequencing operations • checking and clarifying task-related information • applying correct principles for monitoring • selecting appropriate technique for the situation • following standard operating procedures • recording results and preparing and submitting deviation reports
Required knowledge
Look for evidence that confirms knowledge of: • the application of principles and methods for a variety of situations • appropriate records for a variety of situations • hazards and control measures associated with equipment monitoring, including housekeeping • use and application of personal protective equipment • safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform equipment condition monitoring and recording. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with equipment condition monitoring and recording or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Technique may include	Built-in systems (software and site displays), vibration monitors, infra-red and ultraviolet non-destructive testing

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Maintenance and diagnostics

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MEM18016B Analyse plant and equipment condition monitoring results

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers analysing condition monitoring results and developing recommendations based on the analysis. The data analysed is generated by a continuous plant and equipment condition monitoring program.

Application of the Unit

Application of the unit	This unit is intended to apply to the analysis of data generated by a continuous plant and equipment condition monitoring program. The analysis of condition monitoring and production of recommendations is undertaken autonomously. Recommendations may be in writing or verbal. If production of formal reports is required, then appropriate communication units should be accessed. **Band**: **B** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing

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Prerequisite units		
	MEM12003B	Perform precision mechanical measurement
	MEM12023A	Perform engineering measurements
	MEM12024A	Perform computations
	MEM12025A	Use graphical techniques and perform simple statistical computations
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18003C	Use tools for precision work
	MEM18006C	Repair and fit engineering components
	MEM18010C	Perform equipment condition monitoring and recording
	MEM18055B	Dismantle, replace and assemble engineering components

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Analyse condition monitoring results	1.1. Records/graphs/results of condition monitoring are examined and analysed and problem areas are identified. 1.2. Necessary calculations/computations are undertaken. 1.3. Appropriate reports/determinations of analyses are undertaken to prescribed site procedure.
2. Develop recommendations	2.1. Recommendations are developed based on previous history, results, specifications and legislative requirements. 2.2. Recommendations are reported to appropriate authority.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- obtaining results of condition monitoring of plant/equipment
- performing calculations to analyse condition monitoring data
- preparing reports based on the analysis of the condition monitoring data
- reporting recommendations to the appropriate authority
- orally reporting routine information

Required knowledge

Look for evidence that confirms knowledge of:

- the operational specifications of the plant/equipment being monitored
- any trends and/or deviations from operational specifications
- numerical operations and calculations/formulae for data analysis within the scope of this unit
- the reasons for undertaking the identified calculations

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REQUIRED SKILLS AND KNOWLEDGE
• the procedures for reporting the analysis of condition monitoring data • the previous history of the plant/equipment being monitored • any relevant legislative requirements • the operational specifications of the plant/equipment • the recommendations with respect to action to be taken • the reasons for the recommendations made • the expected effect of the recommendations on the operational performance of the plant/equipment • the procedures for reporting recommendations • the authority/person to whom the recommendations are to be made

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to analyse plant and equipment condition monitoring results. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication,

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EVIDENCE GUIDE	
	materials handling, recording and reporting associated with analysing plant and equipment condition monitoring results or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

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RANGE STATEMENT	

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance&diagnostics

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MEM18038B Maintain wheels and tyres

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers assessing wheel condition, and repairing/replacing and maintaining the wheel.

Application of the Unit

Application of the unit	This unit applies to the basic maintenance and repair or replacement of wheel rims and to the full range of wheel/tyre assemblies, plant and equipment using appropriate regulations, codes of practice, manufacturers' specifications or in-house standards as a guide for assessment repair and assembly. For complex rim repairs, appropriate fitting or welding units may be required, for example, Unit MEM18003C (Use tools for precision work) and Unit MEM18006C (Repair and fit engineering components). **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM18001C	Use hand tools

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Assess wheel condition	1.1. Rim/tyre designs, constructions, codes, balancing, fastening principles and terminology are understood. 1.2. Fastening components are correctly assessed for damage and security. 1.3. Abnormal tyre wear is recognised and cause of fault is correctly determined. 1.4. Unsafe tyre and/or wheel condition is recognised and remedial action is determined.
2. Rectify and maintain wheel	2.1. Safety procedures associated with tyre/wheel removal, handling, inflation, assembly and disassembly and fastening are understood and adhered to. 2.2. Wheels/tyres are safely removed and replaced using standard procedures and appropriate tools/equipment. 2.3. Tools and equipment are correctly applied and used.

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ELEMENT	PERFORMANCE CRITERIA
	2.4. Ballasting and/or inflation of tyres is performed safely and to specification. 2.5. Static/dynamic balancing of wheels is performed to specification. 2.6. Rim/tyre/tube faults are rectified to specifications, regulations or codes. 2.7. Rectification activities are accurately recorded. 2.8. Wheel bearings are correctly lubricated to specification.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking task-related information
- checking for conformance to specification
- identifying damaged fastening components
- identifying abnormal tyre wear
- checking wheel fastening components for damage and security
- identifying corrective action to be taken for unsafe tyre and wheel condition
- removing and replacing wheels/tyres using appropriate tools and equipment
- using tools and equipment correctly and appropriately
- undertaking ballasting and/or inflation of tyres
- balancing wheels to specification
- identifying repairable rim, tyre and tube faults
- repairing faults in rims/tyres/tubes to specification
- recording work activities
- lubricating wheel bearings in accordance with specification

Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE
Look for evidence that confirms knowledge of: • the design and construction of a variety of rims and tyres • the principles of fastening and balancing of wheels • the relevant codes and standards • the procedures for checking wheels for secure fastening • the reasons for checking fastening components for damage and security • the causes of abnormal tyre wear • examples and causes of unsafe tyre and wheel condition • the procedures for removing, handling, inflating, assembling/disassembling and fastening of tyres and wheels • the safety precautions to be taken when working with wheels and tyres • the tools, techniques and equipment required to carry out the above procedures • the procedures, tools, techniques and equipment for static and dynamic balancing of wheels • the reasons for selecting the chosen tools, techniques and equipment • the procedures, tools, techniques and equipment for repairing rim, tyre and tube faults • examples of unrepairable rim, tyre and tube faults • the procedures for recording repairs undertaken on rims, tyres and tubes • the procedures for lubricating wheel bearings • types of wheel bearing lubricant and their application • hazards and control measures associate with maintaining and rectifying wheels and tyres, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to maintain wheels and tyres. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and	Assessors must be satisfied that the candidate can

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EVIDENCE GUIDE	
evidence required to demonstrate competency in this unit	competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with maintaining wheels and tyres, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different

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RANGE STATEMENT	
work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18045B Fault find/repair electrical equipment/components up to 250 volts single phase supply

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers locating and rectifying faults in equipment and components using up to 250 V single phase power where these are disconnected from the electrical supply.

Application of the Unit

Application of the unit	This unit covers the competencies required to locate and rectify faults in equipment and components using up to 250 V single phase power, where they are disconnected from their electrical supply. This would also typically cover plug-in appliances. Work is performed onsite. This unit also covers basic mechanical disconnection, dismantling and re-assembly of equipment components, enclosures, drives etc. This unit should not be selected if Unit MEM18046B (Fault find/repair electrical equipment/components up to 1000 volts a.c./1500 volts d.c.) has been selected. When work involves disconnection and reconnection of fixed-wired equipment, Unit MEM18049C (Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.) must also be selected. **Band**: **A** **Unit Weight**: **4**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM10002B	Terminate and connect electrical wiring
	MEM12002B	Perform electrical/electronic measurement
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Locate fault	1.1. Equipment/*component* function is determined by reference to circuit diagrams, schematics, manual and/or consultation with technical adviser. 1.2. Where required, equipment is correctly isolated from power supply. 1.3. Where appropriate, built-in fault indicators and error codes are examined and correctly interpreted, and results are recorded to standard operating procedures. 1.4. Equipment/component is checked and tested using correct and *appropriate techniques*, procedures, tools and *test equipment*. 1.5. Check and test results are correctly interpreted and, where required, verified. 1.6. Equipment/component fault is identified and localised. 1.7. Equipment/component fault/s are correctly recorded to standard operating procedures.
2. Rectify faults	2.1. Using correct and appropriate techniques, procedures, tools and equipment, equipment/component/s are repaired, replaced or adjusted to specification or manufacturers' requirements. 2.2. Equipment/component is checked and tested using correct and appropriate techniques, procedures, tools and equipment for compliance with site or manufacturers' specifications. 2.3. Where appropriate, rectifications report is recorded to standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • obtaining circuit diagrams, specifications, schematics

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REQUIRED SKILLS AND KNOWLEDGE

- isolating electrical equipment/component from the power supply
- tagging and checking isolated electrical equipment/component
- locating and reading/recording built-in fault indicators
- checking and testing electrical equipment/component for correct operation
- verifying variations from specifications indicated by initial test results
- identifying and localising faults in electrical equipment/ components
- recording/reporting faults in the electrical equipment/components
- repairing, replacing or adjusting electrical equipment/components to specification
- referencing supplier catalogues
- confirming that the electrical equipment/components have been returned to specification
- recording rectification of the electrical equipment/ components

Required knowledge

Look for evidence that confirms knowledge of:

- operation and characteristics of active and passive components
- basic motor operation of various types
- function of the electrical equipment/component within the circuit
- hazards associated with the electrical equipment/component
- relevant regulatory requirements
- electrical equipment/component isolation procedures
- test equipment to be used to verify isolation of the electrical equipment/circuit
- errors indicated by built-in devices
- the procedures, tools, equipment and techniques to be used to test the operation of the electrical equipment/component
- reasons for selecting the chosen tools, equipment and techniques
- specifications of the electrical equipment/component
- variations between test results and specifications
- procedures for localising faults in electrical equipment/components
- procedures for recording/reporting faults in electrical equipment/components
- techniques/procedures for returning the electrical equipment/components to specification
- adjustments that can be made to electrical equipment/components
- procedures for confirming the electrical equipment/components have been returned to specification
- procedures for recording electrical equipment/component rectifications

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to fault find/repair electrical equipment/components up to 250 V single phase supply. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with fault finding/repair of electrical equipment/components up to 250 V single phase supply, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes,

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EVIDENCE GUIDE	
	standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Components	Brushes, armatures, windings, relays, programmable controllers or other electronic switching devices
Appropriate fault finding techniques	Testing for voltage, current, frequency, polarity, phase, circuit continuity, insulation resistance, earth continuity etc.
Test equipment	Continuity testers, ammeters, voltmeters, multimeters, tong testers, wattmeters, etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units	

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Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18055B Dismantle, replace and assemble engineering components

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers dismantling and identifying faulty components, selecting replacements, and assembling engineering components into assemblies or sub-assemblies in accordance with standard operating procedures.

Application of the Unit

Application of the unit	This unit involves dismantling, checking, replacing and assembling engineering components in accordance with standard operating procedures. All specifications are interpreted from manufacturers' manuals, engineering drawings, detailed/technical sketches and associated data sheets. Tasks are undertaken utilising engineering principles, designated procedures, appropriate tools, equipment and safe workshop practices. Work is undertaken autonomously or in a team environment using predetermined standards of quality, safety and workshop procedures. Where fitting techniques and principles are required to assess component condition, and/or modify components to achieve precision fits, unit MEM18006C (Repair and fit engineering components) should also be selected. Where precision mechanical measurement is required, then Unit MEM12003B (Perform precision mechanical measurement) should also be selected. **Band**: **A** **Unit Weight**: **3**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Dismantle engineering	1.1. Engineering components are inspected and task

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ELEMENT	PERFORMANCE CRITERIA
components	requirements are analysed. 1.2. Appropriate tools and equipment are selected and component/s are prepared for dismantling. 1.3. Component is dismantled using standard operating procedures, tools and equipment. 1.4. Engineering components are clearly marked to aid reassembly.
2. Identify faulty components	2.1. Specifications for components are obtained from appropriate source and are interpreted and understood. 2.2. Damaged or faulty components are assessed against specifications according to standard operating procedures. 2.3. Faulty components are identified for repair, replacement or adjustment according to standard operating procedures.
3. Select replacement components	3.1. Where applicable, replacement and/or repaired parts are selected for reassembly according to standard operating procedures.
4. Assemble engineering components into assemblies or sub-assemblies	4.1. Appropriate techniques are applied in the preparation, assembly and adjustment of components using fastening equipment and methods which ensure conformance to specifications, operational performance, quality and safety of the completed assembly according to standard operating procedures. 4.2. Correct lubrication, packing, sealing materials are selected and applied correctly in conformance to job specifications. 4.3. Final component assembly is inspected, tested and adjusted as necessary for compliance with operational specifications and returned to use according to standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE

Required skills

Look for evidence that confirms skills in:

- obtaining and interpreting all relevant instructions, standard operating procedures, drawings and specifications
- preparing component for dismantling
- dismantling components using appropriate techniques, tools and equipment
- marking component parts appropriately for identification purposes
- checking components visually and dimensionally for conformance to specification
- where appropriate, marking faulty parts for repair, replacement or adjustment
- selecting and confirming replacement parts to specifications
- obtaining and using all relevant supplier catalogues
- preparing and assembling components using appropriate techniques in accordance with standard operating procedures
- where appropriate, applying lubricants correctly to the assembly in accordance with specifications and standard operating procedures
- where appropriate, applying packing and/or sealing materials in accordance with specifications and standard operating procedures
- inspecting and checking the final assembly for conformance to specification
- where appropriate, returning the final assembly to use

Required knowledge

Look for evidence that confirms knowledge of:

- tasks to be performed in accordance with standard operating procedures
- procedures for dismantling the assembly
- tools and equipment to be used to dismantle the components
- procedures and required equipment for checking components for conformance to specification
- specifications of the components to be replaced
- features and/or dimensions upon which replacement parts are to be selected
- process of identifying replacement parts from "third party" suppliers' catalogues
- procedures for assembling components
- requirements of the assembly in terms of specifications, operational performance, quality and safety
- procedures for lubricating the assembly
- materials
- checks to be undertaken during inspection of the final assembly
- procedures for returning components/assemblies into use
- hazards and control measures associated with dismantling, replacing and assembling engineering components, including housekeeping

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REQUIRED SKILLS AND KNOWLEDGE
• safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to dismantle, replace and assemble engineering components. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with dismantling, replacing and assembling engineering components or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not

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EVIDENCE GUIDE	
	require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Engineering components	Includes a range of component parts found in equipment or product assemblies, sub-assemblies, e.g. couplings, universal joints, pumps etc. employing shafts, pre-manufactured bearings and seals, lubricants, fasteners, gaskets etc.
Appropriate tools and equipment	Includes a range of hand and power tools, bearing pullers, special purpose dismantling and assembly tools etc.
Selected	Replacement parts are selected from manufacturers' catalogues, etc.
Appropriate techniques	Are in accordance with standard operating procedures and may include the straightforward removal and replacement of pre-manufactured bearings and seals

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM22001A Perform engineering activities

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers the performance of technical aspects of engineering work in accordance with established engineering principles and practices.

Application of the Unit

Application of the unit	This unit applies to technical activities carried out within a range of engineering disciplines. It incorporates the personal and technical requirements to perform engineering activities where outcomes and performance measures are negotiated with appropriate personnel, technical experts and specialists. This unit only has application in qualifications that are not points based. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM16006A	Organise and communicate information

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify and implement engineering practices	1.1. Engineering practices applicable to engineering activities are identified. 1.2. Factors, conditions and contexts integral to effective engineering practice are researched and evaluated. 1.3. The application of management practices and regulatory/legal systems to engineering practice is researched and evaluated. 1.4. Elements of engineering practices are incorporated into engineering activities.
2. Negotiate, document and monitor outcomes and performance measures	2.1. Technical experts and specialists are consulted as required. 2.2. Engineering options are evaluated and ranked. 2.3. Performance measures for processes and outcomes are negotiated with stakeholders and documented.
3. Negotiate, develop	3.1. Work instructions are negotiated and documented

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ELEMENT	PERFORMANCE CRITERIA
and document work instructions	with taskforce.
4. Perform hazard and risk analysis	4.1. Hazards and risks associated with project are analysed.
5. Monitor progress, respond appropriately	5.1. Progress is monitored and responded to in cooperation and consultation with stakeholders and taskforce.
6. Conclude engineering activities appropriately	6.1. Engineering activities are concluded in accordance with workplace and legislative requirements.
7. Evaluate career options and develop career development strategy	7.1. Career options are developed based on current engineering activities. 7.2. A portfolio or CV of current engineering activities that is also a framework for future engineering activities is developed.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- research and evaluation
- review and maintenance of academic development, work experience, ethical practice, indemnity, negotiation, consultation and human relations with respect to the practice of engineering
- consultation with technical experts and specialists
- evaluation and ranking of engineering options for particular applications
- designing and planning documentation for particular applications
- documenting work instructions
- implementing occupational health and safety and environmental regulations, codes of practice and statutory requirements
- identifying and analysing hazards and risks
- monitoring and consultation with stakeholders and taskforce
- research and evaluation of engineering career options based on current engineering activities

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge
Look for evidence that confirms knowledge of: • political, social and environmental context and possible range of particular engineering activities • the effect of government policy on industrial education and training, immigration for industrial labour/ skills, globalisation, the quality movement, JIT and competitive or lean manufacturing on a range of applications using jobbing, batch, mass or continuous production • the significance, need for continual review and maintenance of academic development, work experience, ethical practice, indemnity, negotiation, consultation and human relations with respect to the practice of engineering • the significance and applicability of strategic industrial management, financial management, workteams, supervision and control, industrial relations, OHS&E, enterprise based agreements, chemical registers, noise abatement, industrial law to particular industrial applications and work environments • the application and affect of elements of engineering practice on particular engineering activities • methods for evaluation and ranking of engineering options including the use of decision making and problem solving tools (eg. Kepler Trebor method) • the significance of documented processes and outcomes performance measures in the context of client requirements, industrial, social, political and economic environments • documented work instructions in the context of the objectives of the engineering activity • negotiating principles • risk assessment tools such as "risk matrix' and "Monte Carlo" risk assessment • the significance of statutory requirements disaster management strategies • long term environmental and sustainability issues associated with the engineering activity • documentation and conclusion procedures • relevance of current engineering activities to future career options • the value of a portfolio in contributing to future career options in engineering

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the

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EVIDENCE GUIDE	
performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform engineering activities within one or more specified engineering disciplines. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing engineering activities or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Factors, **conditions and contexts**	• Academic development, work experience, ethical practices, indemnity, negotiation, consultation and human relations • Applicable local, regional, national and international economic, political and social contexts
Management practices	Strategic industrial management, financial management, workteams, supervision and control.
Regulatory/legal systems	Industrial relations, OHS&E, enterprise based agreements, chemical registers, noise abatement, industrial law to particular industrial applications and work environments

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Management and organisation

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MEM22002A Manage self in the engineering environment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing work ethically and competently, making judgements about work priorities and information requirements to achieve effective working relationships and engineering outcomes.

Application of the Unit

Application of the unit	This unit applies to the use of various self management techniques in the performance of engineering activities. Techniques may involve task and time management, effective communication strategies, document management, and business relations. This unit only has application in qualifications that are not points based. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM16006A	Organise and communicate information

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Manage self	1.1. Manage own time and own processes in an engineering environment for planning and design purposes. 1.2. Manage learning opportunities in and outside the workplace. 1.3. Complete tasks / roles in a competent and timely manner.
2. Work effectively with team	2.1. Communicate effectively with others. 2.2. Recognise cultural diversity. 2.3. Use judgement and discretion as appropriate to the situation. 2.4. Work autonomously to procedures and guidelines. Develop and maintain trust and confidence of colleagues and clients/suppliers where appropriate. 2.5. Mentor others in specific areas of engineering focus.

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ELEMENT	PERFORMANCE CRITERIA
	Accept appropriate responsibility.
3. Manage information	3.1. Locate and review relevant information on materials, products, processes or services including relevant legislation, codes and national standards. 3.2. Document processes and outcomes. Include OHS&E procedures.
4. Manage work priorities and resources	4.1. Prioritise competing demands to achieve personal, team and an organisation's goals and objectives. 4.2. Prepare, monitor and review work plans, programs and budgets. 4.3. Plan resource use to achieve targets.
5. Facilitate and capitalise on change and innovation	5.1. Work with others to introduce change. 5.2. Manage emerging challenges and opportunities.
6. Establish and maintain business relationships	6.1. Work in collaborative relationships with customers/suppliers. 6.2. Manage the procurement process.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- setting personal goals and plans
- completing allocated within time limits
- seeking feedback from internal and external sources
- providing clear and precise information to team members
- communicating in meetings
- using feedback to develop ways of improving performance
- accessing and using appropriate development opportunities
- team members are mentored in specific areas of engineering relevant to their work, where appropriate.
- obtaining all relevant legislation, statutory requirements and standards
- obtaining all relevant commercial documents

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REQUIRED SKILLS AND KNOWLEDGE

- documenting the processes and outcomes
- processing and filing the masters and file copies of documents
- setting priorities
- using technology appropriately to manage work priorities and commitments
- work plans, programs and/or budgets are prepared in accordance with organisational procedures.
- monitoring, reviewing and modifying work plans, programs and/or budgets
- achieving targets by the effective and efficient use of resources
- introducing changes smoothly and with minimal disruption
- communicating changes to be implemented
- preparing plans for the implementation of authorised changes
- providing regular and complete progress reports to clients/stakeholders/suppliers/regulators
- procuring materials/supplies/services in accordance with organisational procedures

Required knowledge

Look for evidence that confirms knowledge of:

- techniques for ensuring that personal goals and plans reflect an organisation's plans and personal roles, responsibilities and accountabilities
- the way in which a person's performance acts as a role model for others
- ways in which personal goals are achieved and extended
- the importance and benefits of maintaining consistent personal performance
- the value of cultural diversity within the engineering team is recognised and the benefits
- internal and external sources of feedback on products, services and/or performance
- team members roles and responsibilities
- ways of gaining and using feedback to improve personal performance
- options for suitable professional development opportunities
- the role of mentor in the engineering team
- the mentoring process
- sources of relevant codes, standards, legislation and regulations
- the need and relevance for commercial information, including insurances and indemnities
- the procedures for documenting processes and outcomes
- the procedures for processing and filing master and file
- techniques for prioritising competing demands
- options for using various types of relevant technology and the ways they can be used efficiently and effectively to manage work priorities and commitments
- the procedures for preparing work plans, programs and budgets
- the authority responsible for authorising work plans, programs and budgets
- the procedures for modifying work plans, programs and/or budgets

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REQUIRED SKILLS AND KNOWLEDGE
• human and physical resources available • targets to be achieved • techniques for optimising resource utilisation • opportunities to introduce change • the benefits of the proposed change • the costs and risks associated with the proposed change • those affected by change • emerging challenges and opportunities in the area of engineering expertise • opportunities to implement change and innovation • reasons for implementing change and innovation • strategies for implementing change and innovation • customer needs • clients/stakeholders/suppliers/regulators and their business relationships • information required by clients/stakeholders/suppliers/ regulators • the suppliers of materials/services/components/ equipment, etc. • procurement procedures • the authority responsible for authorising the procurement of materials/supplies/services • commercial issues associated with the procurement process

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to manage self in the engineering environment. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for	This unit may be assessed on the job, off the job or a

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EVIDENCE GUIDE	
assessment	combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with managing self in the engineering environment or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Engineering environment	Refers to a real or simulated environment dealing in engineering practices/functions/services.
Tasks/roles	Will be involved in self-directed application of knowledge - have substantial depth of knowledge in some areas and a range of skills for work tasks, roles and functions.
Cultural diversity	Refers to all aspects of diversity within the working environment such as gender, age, physical ability, sexual preference, ethnicity and culture.
Work autonomously	May work autonomously under broad guidance; may supervise others and may guide teams.
Appropriate responsibility	May have responsibility for planning and managing the work of others.
Relevant legislation codes and national standards	Refers to all the legislation that occurs in the work place such as equal employment opportunity legislation, occupational health and safety legislation and industrial relations legislation.
Document	Applies to the time frame of the design development. Agreed processes of documentation will be required and applied.
OHS&E	Occupational Health Safety and Environment recognizes that stakeholders in workplace activity include the workforce exposed to worksite conditions, materials and processes of the activity and the broader community exposed to environmental effects of the activity. Apply in accordance with organisational policies and statutory and regulatory requirements.

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Management and organisation

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MEM22007A Manage environmental effects of engineering activities

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers examining environmental issues and determine environmental strategies associated with engineering work.

Application of the Unit

Application of the unit	This unit applies to a variety of environmental management techniques, including taking inventory of existing environmental condition, documenting/reporting initial assessment, determine and document/report stakeholder's expectations for improvements on initial condition against possibilities for improvement; developing, evaluating&ranking strategies for sustainable development; implementing, monitoring&evaluating strategies; applying environmental management techniques to a new or existing product, process, system or service. This unit only has application in qualifications that are not points based. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM16006A	Organise and communicate information

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine the existing environmental condition	1.1. Research, debate and report on case studies involving examination of environmental values. 1.2. Prepare an inventory of the existing environmental condition. 1.3. Record/report on the findings of the initial assessment.
2. Establish stakeholders' expectations	2.1. Determine expectations regarding each component of the environment. 2.2. Record and report on expectations for project/ operation integration.
3. Review existing	3.1. Determine variations between expectations and the

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ELEMENT	PERFORMANCE CRITERIA
environmental conditions against stakeholders' expectations	existing environmental conditions. 3.2. Establish the possibilities and options for improvement in the environment.
4. Develop and rank strategies to achieve sustainable development	4.1. Evaluates available options against assessment criteria to identify risks and priorities. 4.2. Develop an environmental report on strategies to implement the preferred options.
5. Implement strategies to achieve sustainable development	5.1. Implement strategies in consultation with appropriate stakeholders. 5.2. Collect and review data on implementation of strategies. 5.3. Evaluate progress and review strategies.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- undertaking debate on environmental values
- reporting on case studies involving examination of environmental values
- producing inventory of existing environmental conditions
- documenting the findings of the initial environmental assessment
- identifying stakeholders' environmental expectations
- integrating environmental expectations with the overall outcomes of the operation/project
- communicating expected outcomes to stakeholders
- documenting variations between expected and current environmental status
- implementing strategies for improving the environmental outcomes of the project/operation
- evaluating available options
- implementing selected sustainable development options
- developing environmental management plans
- monitoring the implementation of the environmental management plan
- collecting environmental data

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REQUIRED SKILLS AND KNOWLEDGE
• reviewing and evaluating implementation strategies
Required knowledge
Look for evidence that confirms knowledge of: • environmental conditions of the workplace/process/ operation/procedure • the procedures for documenting environmental conditions • applicable environmental legislation and regulations • the legislative/regulatory reporting and recording requirements • the tests and testing procedures required to establish environmental conditions • stakeholders' views on specific options for environmental improvement • opportunities for integrating project/operation outcomes with environmental improvement options • variations between expected and current environmental status • options for improving the environmental status of the project/operation • the costs/benefits of the identified options • the concept of sustainable development • options for sustainable development • criteria for assessing the feasibility of available options • the risks and priorities associated with sustainable development • strategies to implement sustainable development options • the procedures for communicating sustainable development options to stakeholders • strategies to implement environmental development plans • the data necessary to evaluate the implementation of the environmental management plan • procedures for collecting and documenting environmental data • benchmarks against which implementation strategies can be evaluated

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to manage the environmental effects of engineering activities. Competency in this unit cannot be

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EVIDENCE GUIDE	
	claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with managing the environmental effects of engineering activities or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Environmental values	Biophysical values eg. clean air, soil, water, biodiversity, ecosystem sustainability, sustaining the quality of natural and artificial environments, both indoor and outdoor Socio cultural values
Existing environmental conditions	Identification of environmental relations - mapping all the relations that will be used and affected by a particular activity in both space and time, analysing the resulting relational map for areas of intense impact, especially as a result of cumulative impacts; identification of physical, socio-cultural and economic conditions for life and for the existing or desired quality of life, identification of the socio-cultural values placed on the current environmental conditions; identification of both the negative and positive environmental impacts, the potential de-sustaining and sustaining aspects of the activity; identification of where engineering interventions and follow-up are possible
Environmental report	A description of the state of the environment, an assessment of the nature and consequence of impacts, identifiable trends, available and recommended actions, identification of responsibilities and potential change agents, cost of action; a critical review of the parameters of the environmental relations considered, the criteria by which they were evaluated, the process of developing responses and the achievement of the actions taken

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Management and organisation

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MEM22012A Coordinate resources for an engineering project or operation

Modification History

Release 1 - New unit. Replaces MEM22003A, but not equivalent.

Unit Descriptor

This unit of competency covers the coordination of resources in accordance with operations or project plans and budgets formulated to meet business goals and strategic objectives.

Application of the Unit

This unit applies to engineering projects or operations that have a significant engineering component. It is suitable for people with responsibility for resources and those pursuing technical qualifications and careers at engineering technician level.

Prior or concurrently developed experience in mathematics, computer packages and file handling, engineering plant, facilities and services, materials, methods and processes is required.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

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Elements and Performance Criteria

1	Contribute to operations or project planning and budgeting	1.1	Participate in policy and procedures development
		1.2	Review sustainability implications of resources, sourcing, processing, process waste, transport, distribution, life cycle and disposal
		1.3	Participate in planning for operations or project resourcing in the context of operations, project, strategic and business plans
		1.4	Participate in development of budgets
		1.5	Participate in development of performance indicators or parameters, monitoring and continuous improvement processes
		1.6	Participate in the development of resources information distribution and control systems, including the use of software systems
2	Evaluate supply chain relations	2.1	Identify supply value chain members and contribution to project or operation
		2.2	Assess supply agreements, quality and delivery parameters against performance indicators
		2.3	Employ value analysis of product or customer service costs
		2.4	Assess tender and contract documents for risk
		2.5	Assess supply chain communications for feedback on quality, supply chain efficiency and continuous improvement processes
3	Coordinate physical resources	3.1	Assess physical resource requirements and develop a resources distribution schedule consistent with the budget
		3.2	Coordinate efficient utilisation of physical resources
		3.3	Ensure compliance with work health and safety (WHS), regulatory and risk management requirements with particular emphasis on handling and use of resources

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4	Contribute to project or operation human resources management	4.1	Identify labour and skills requirements based on assessment of timetable and project or operational requirements
		4.2	Program and communicate labour and skills to satisfy project or operational technical and budget requirements
		4.3	Organise labour and skill schedules to facilitate training
		4.4	Contribute to skills development and training arrangements
5	Contribute to budget development and control	5.1	Participate in developing budgets in the context of business and strategic operations or project plans
		5.2	Control delegated expenditure and cash flow
		5.3	Record resources utilisation and costs, including those for maintenance of assets
6	Supervise and review resources delivery	6.1	Apply systems thinking, constraints and contingency management, and continuous improvement techniques
		6.2	Monitor and review supply chain and coordinate continuous improvements
		6.3	Monitor physical and human resources and performance indicators and coordinate continuous improvement processes
		6.4	Monitor budget and coordinate response to threats
		6.5	Monitor sustainability and coordinate responses in accordance with sustainability policy and procedures
		6.6	Monitor information and resources control system and implement continuous improvement
		6.7	Employ software packages to achieve information handling, data processing, planning and control objectives

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7	Report and document resources coordination	7.1	Report in accordance with procedures
		7.2	Maintain documentation on planning, supply chain analysis, resources requirements analysis, budgets, delivery, continuous improvement and training, WHS and regulatory requirements, and risk assessment

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- participating and communicating with others
- negotiating and seeking consensus in support of strategic objectives
- evaluating:
  - supply chain, quality, delivery and capability
  - tender and contracting processes and documents
- coordinating physical and human resources
- coordinating and controlling resource budgets
- monitoring, reviewing and improving resources delivery
- planning for operations or project resourcing in the context of operations, project, strategic and business plans
- participating, cooperating and negotiating required for dealing with customers, contractors, designers and production management
- determining take off quantities for ‘bill of materials’ from drawings, specifications and contracts
- reporting and documenting objectives, key performance indicators, timetables and progress

Required knowledge

Required knowledge includes:

- typical sustainability implications for engineering projects or operations
- systems thinking, constraints and contingency management, and continuous improvement techniques
- procedures for preparing and monitoring project plans, business plans and budgets
- cost planning, cost-benefit analysis, life cycle costing, valuation and cost estimation procedures
- procedures for assessing implications of design on project implementation costs or

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manufacturability of product and maintainability of plant and process
- resources information distribution and control systems, including the use of enterprise resource planning (ERP) and materials resource planning (MRP) software
- planning and cost control software
- supply and value chain evaluation techniques, including contract, quality and delivery parameters
- engineering-related operating procedures associated with the use of resources
- financial impact of a variety of maintenance strategies on overall costs on typical tenders, contracts and law of contract provisions, relevant to engineering projects or operations
- ability to calculate quantities from drawings, specifications and contracts
- WHS requirements, including WHS Acts and regulations
- resources expenditure and cash flow control procedures
- procedures and requirements of financial records, including records of resources and costs for maintenance of assets

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to coordinate resources for an engineering project or operation within project plans and budgets. This includes working individually and as part of a team and recognising and complying with normal control procedures on engineering projects.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • participate, communicate, cooperate and negotiate strategic objectives, policy and procedures development • evaluate supply chain, quality, delivery, capability, tender and contracting processes and documents • coordinate and control physical and human resources and resource budgets • monitor, review and improve resources delivery • report and document resource planning and use.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations.

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	• The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Participate	Participation includes the requirement to communicate, cooperate, negotiate and work with others in accordance with the operations or

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	project plans
Software packages	Software packages may include: • spreadsheets • databases • word processor • presentation • project management and cost control • system control and data acquisition (SCADA), MRPII, MRPIII and ERP
Value analysis	Value analysis is the determination of value-added, as defined by the ultimate customer at each step in the supply chain or production process or service provision. The value is often specified in contract documentation in terms of quality, cost, quantity and delivery schedule
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain
WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Continuous improvement implementation	Continuous improvement implementation may relate to: • plant, products, processes, systems or services, including design, development, implementation or manufacture, commissioning, operation or delivery and maintenance Improvement processes may include techniques, such as: • balanced scorecard • current and future state mapping

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	• measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training
Manage constraints and contingencies	Contingencies arising during operations or improvement projects are responded to in the context of constraints. Contingencies may threaten operations or improvement projects and planning for contingencies may be essential to maintain resources, skilled labour and schedules. Each contingency will have constraints on possible solutions. These may be: • financial, organisational, procedural or cultural constraints • physical constraints, such as limits to resources, limits to site access or logistical limitations
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer

Unit Sector(s)

Competency field

Unit sector Management and organisation

Custom Content Section

Not applicable.

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MEM22013A Coordinate engineering projects

Modification History

Release 1 - New unit. Replaces MEM22004A, but not equivalent.

Unit Descriptor

This unit of competency covers the coordination of engineering projects within project plans and budgets. It includes monitoring and maintaining the project implementation plan, performance analysis and use of project management software.

Application of the Unit

This unit applies to people with significant coordination and facilitation responsibilities for engineering or related projects. The projects will usually have fixed term or purpose and involve specific engineering-related tasks, such as installation and commissioning of plant, design of equipment or major overhauls.

The coordination role covered by the unit includes monitoring of engineering and other technical performance parameters against the project plan as well as monitoring of other project parameters that impact on engineering and technical compliance of the project. These include finance, accounting, budgeting and control, resourcing, tenders, contracts, work health and safety (WHS), risk management, human resources, and legal and regulatory requirements.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used,

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a unit of competency.	further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Review and confirm parameters of delegated project	1.1	Review designs, drawings, standards and established implementation plan and schedule to establish scope of the engineering project
		1.2	Review budget and control measures for delegated project
		1.3	Review project management structure, functional team relationships, communications and reporting lines
		1.4	Review materials, logistics and services procurement requirements
		1.5	Review the need for appropriate technical and professional assistance
		1.6	Review physical resources requirements
		1.7	Review human resources and skills development requirements
		1.8	Review compliance requirements for project, including WHS requirements, codes of practice, regulations, standards, legal and other regulatory requirements, and enterprise procedures
2	Coordinate implementation of delegated project	2.1	Assign and obtain team agreement to plans, communication arrangements, responsibilities, schedules and requirements
		2.2	Establish liaison arrangements with other functional groups
		2.3	Ensure efficient and documented arrangements for requests for further information (RFIs) from designers and other experts
		2.4	Confirm internal and external reporting requirements,

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			including content, schedule and sign-off arrangements
		2.5	Confirm suppliers, contractors and delivery schedules, and any installation requirements
		2.6	Coordinate actions to overcome constraints and contingencies, including coordination with stakeholders and adjustments, if necessary, to plans and schedules
		2.7	Coordinate and monitor specialist and technical support services to meet schedules, budgets and performance requirements
		2.8	Maintain and monitor records of project tasks for accountability against objectives, schedule and budget
		2.9	Apply principles of continuous improvement to implementation
		2.10	Implement project management, resources control and budgeting software, when required
3	Report on outcomes	3.1	Record progress in accordance with procedures
		3.2	Supervise the completion of project, including sign-off and completion of required documentation of the project

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- coordinating technically complex engineering-related projects
- project management skills, including using resources control and budgeting software, as required
- reviewing, confirming and establishing parameters for project objectives, project plan, budget and scheduling related to tasks
- communicating, negotiating and reviewing with stakeholders throughout project duration
- coordinating and monitoring task schedules and resources; addressing contingencies and constraints, continuous improvement, problem solving and decision making; and adjusting short-term planning and rescheduling, as necessary

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- implementing systems thinking and concurrent engineering, as appropriate
- project planning and scheduling, including:
  - working within or establishing a project management structure
  - establishing functional team relationships, communications and reporting lines
  - ensuring compliance with business plans, financial objectives, budgets and customer brief
  - incorporating WHS and other regulatory requirements
- establishing accountabilities and responsibilities (including recording and reporting) for:
  - scheduling and implementation of project tasks
  - physical and financial resources and budget
  - the use of professional services and contractors
  - maintaining records of trades and industry contacts and sources of expert advice
  - records of procedures and regulatory compliance
  - personal and team skills development
  - maintaining task schedules, Gantt charts and other planning tools and resources
  - procedures for addressing contingencies and constraints, continuous improvement, problem solving and decision making, and adjusting short-term planning and rescheduling as necessary
  - organisational procedures for compliance with WHS, codes of practice, and other legislative requirements, environmental and social obligations, and ethical practice
  - risk management procedures

Required knowledge

Required knowledge includes:

- engineering and technology knowledge appropriate to the project
- context of project, including:
  - customer-supplier relationships
  - regulatory requirements and environment
  - materials resourcing and labour and skills supply arrangements
  - market and competitive environment
- human resources and skills development procedures and options for skill needs typical of engineering projects
- typical budget and control measures for engineering-related projects, including:
  - audit
  - tenders
  - contracts
  - schedules
  - budget categories and items:
    - personnel
    - materials

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    - equipment procurement and maintenance
    - contractors
    - logistics
    - security
- requirements for and functions of technical documentation, graphics and specifications, meeting procedures, records and minute taking
- WHS Acts and regulations relevant to engineering projects
- risk management procedures, isolation and notification procedures in the event of irregularities or accident
- systems thinking, contingency and constraints management
- conflict resolution, problem solving and decision making

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to coordinate an engineering project This includes working individually and as part of a team and recognising and complying with normal control procedures on engineering projects.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • review, confirm and establish project objectives, plans and schedules • identify technical and engineering requirements of project from drawings, customer briefs, contracts and other appropriate sources • identify and manage stakeholders, including customers, suppliers, contractors and regulatory agencies • manage for contingencies and non-conformances • cooperate, communicate and negotiate effectively with stakeholders.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to

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	work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Personal responsibilities	Personal responsibilities within the project may be defined by: • role specification and delegations • workplace agreement or Award • negotiation with clients and/or supervisors • contracts • legal or regulatory obligations

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	• professional and ethical considerations • agreed operational or project requirements
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain
WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • environmental protection and planning law • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Stakeholders	Relevant stakeholders may include: • teams • contractors • support professionals and teams • technicians • functional groups • customers • suppliers
Records of project	Records of project may include: • tenders and contracts • schedules • personnel • resource allocations and financial management procedures • standard operating procedures, including maintenance procedures • WHS committee minutes and action

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	• risk management and mitigation • documentation and records of current safe work methods statements (SWMS), material safety data sheets (MSDS), work permits, standards and codes of practice • audits • meetings and communications • graphics and specifications

Continuous improvement implementation	Continuous improvement implementation may relate to:
	• plant, products, processes, systems or services, including design, development, implementation or manufacture, commissioning, operation or delivery and maintenance. It may include techniques, such as:
	  • balanced scorecard
	  • current and future state mapping
	  • measuring performance against benchmarks
	  • process improvement, problem solving and decision making
	  • data management, generation, recording, analysing, storing and use of software
	  • training for improvement systems participation
	  • technical training

Appropriate technical and professional assistance	Appropriate technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers
	• professional and technical support for specific technologiesand equipment
	• professional services for:
	  • finance, accounts and tax
	  • insurance and legal,
	  • training and human resources

Constraints and contingencies	Constraints and contingencies may be: • financial, organisational, procedural or culture constraints • physical constraints, such as limits to resources, limits to site access or logistical limitations

Unit Sector(s)

Competency field

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Unit sector Management and organisation

Custom Content Section

Not applicable.

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MEM22014A Coordinate engineering-related manufacturing operations

Modification History

Release 1 - New unit. Replaces MEM22005A, but not equivalent.

Unit Descriptor

This unit of competency covers the skills and knowledge required to coordinate, monitor and maintain engineering-related manufacturing operations, including the coordination of purchasing, scheduling of materials and resources, achievement of budget with control of processes, physical resources, maintenance of operations and assets, performance analysis and process improvement, work health and safety (WHS) and risk management.

Application of the Unit

This unit applies to people with coordination and facilitation responsibilities for significant manufacturing operations.

Where the planning, scheduling and purchasing is done in an engineering or manufacturing organisation following lean principles, it is recommended that appropriate competitive systems and practices units of competency also be selected.

The unit applies where the coordination role involves application of engineering skills and knowledge to ensure safe, effective and efficient manufacturing and can include specific engineering-related tasks, such as installation and commissioning of plant, design of equipment and major overhauls.

The coordination role of the unit includes monitoring engineering and other technical performance parameters against the project plan as well as monitoring other project parameters that impact on engineering and technical compliance of the project. These include finance, accounting, budgeting and control, resourcing, tenders, contracts, WHS, risk management, human resources, and legal and regulatory requirements.

For coordination skills for time-defined engineering projects see unit MEM22013A Coordinate engineering projects.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

MEM23004A	Apply technical mathematics
MEM14091A	Integrate manufacturing fundamentals into an engineering task

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Develop the production plan	1.1	Coordinate development of, or obtain, demand forecast
		1.2	Participate in preparation of production plan in consultation with relevant stakeholders to meet quality, demand and delivery timelines within capacity and budget constraints
		1.3	Coordinate preparation of purchasing schedules
		1.4	Coordinate preparation of production schedules, including allowances for scheduled maintenance and any required shutdown periods
		1.5	Coordinate development of risk management and contingency procedures
		1.6	Review production plan with relevant stakeholders and adjust, as necessary
		1.7	Coordinate development of key performance indicators (KPIs) and monitoring procedures with relevant stakeholders
		1.8	Incorporate professional and technical assistance, as

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			required
2	Coordinate the implementation of the production plan	2.1	Allocate responsibilities for purchasing and detailed scheduling, including communication of priorities and KPIs
		2.2	Coordinate materials and product flow and transfer operations to meet plan requirements, including buffer and emergency stocks, warehousing, stores and logistics
		2.3	Monitor quality and process control procedures
		2.4	Coordinate and monitor physical, human and financial resources, and budget to achieve production plan
		2.5	Review and monitor information and reporting procedures to stakeholders
		2.6	Address systems constraints and contingencies and adjust short-term planning and reschedule, as necessary
3	Monitor operational performance	3.1	Review actual indicators against KPIs
		3.2	Review manufacturing operations against production plan and other KPIs
		3.3	Participate in continuous improvement procedures, including lean operation principles and procedures, where implemented
		3.4	Monitor preventative and breakdown maintenance and review impact on operational performance
		3.5	Monitor implementation of risk management procedures during non-conformances and adjust, as required, in accordance with organisational procedures
		3.6	Report progress against production plan in accordance with procedures
		3.7	Provide documentation, data entry and analysis, as required

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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying equipment and process capacity from information supplied by designers and suppliers
- developing production schedule demand forecast from information supplied by customers, distributors, and sales and marketing departments
- preparing master production, schedule or project plan
- detailed operations planning, scheduling, production control and contingency measures that take into account:
  - facilities
  - services
  - plant and tooling
  - enterprise resource planning (ERP) software
  - process layout
  - use of automation
  - product manufacturability
  - asset maintainability
- preparing purchasing schedules and coordinating material supplies
- complying with WHS and regulations, codes of practice, standards and risk assessment
- coordinating manufacturing operation to be consistent with business plans and legal and regulatory requirements, and coordinating systems maintenance of manufacturing operation following improvement procedures
- use of software, such as ERP, system control data acquisition (SCADA) and spreadsheets, where installed
- coordinating manufacturing operations to schedule and priority
- maintaining quality and process control procedures
- coordinating problem solving and decision making, short-term planning and rescheduling to meet constraints and contingencies, as necessary
- maintaining records, reporting and documenting in accordance with procedures

Required knowledge

Required knowledge includes:

- manufacturing management systems
- forecasting, scheduling and production control procedures
- production systems, including assembly and process layouts, material and product flows, automation and control systems
- WHS requirements, codes of practice, regulations, standards, regulatory requirements, risk

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management, current safe work methods statements (SWMS), material safety data sheets (MSDS) and work permits
- budgeting, costing and control measures
- quality and process control measures
- asset maintenance techniques and management options
- continuous improvement procedures
- problem solving and decision making, systems thinking, contingency and constraints management as applied to manufacturing
- requirements for and functions of technical documentation, graphics and specifications
- sustainability implications of manufacturing operations, products and processes, including social, environmental, resources and economic implications
- reporting and documenting procedures used in manufacturing, including role of standard operating procedures, engineering drawings and process control charts

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to coordinate, monitor and maintain an engineering-related manufacturing operation, including purchasing, scheduling of materials and resources and priorities. This includes working individually and as part of a team and recognising and complying with normal organisation control procedures.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently:
	• prepare production or project plan in consultation with relevant stakeholders to meet WHS, quality, demand and delivery requirements within capacity and budget constraints
	• apply procedures to ensure compliance of manufacturing operations with WHS, environmental and other regulatory requirements
	• review and monitor facilities and services, including:
	  • plant, tooling and software
	  • process layout
	  • use of automation and automation safety
	  • product manufacturability and asset maintainability
	  • compliance requirements of WHS and regulations, codes of practice, standards, risk assessment and registration requirements for manufacturing plant.

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Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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Relevant stakeholders	Relevant stakeholders may include: • team • organisation functional groups • support professionals and licensed technicians • customers and suppliers
WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Records	Records may include: • forecasts, schedules and budgets • records of operations, production quantities, quality and supply performance • process, resources and budget control measures • communications, graphics and specifications • tenders, contracts and schedules • personnel, resource allocations and financial management procedures • standard operating procedures, including maintenance procedures • records of procedures and legislative compliance

Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring or devices with high current or voltages above extra low voltage
	• professional support for engineering research, calculations and technologies
	  • professional services in non-engineering related areas, such as:
	  • finance, accounts and tax
	  • insurance and legal

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	• training and human resources
Continuous improvement procedures	Continuous improvement procedures may relate to plant, products, processes, systems or services, including design, development, implementation or manufacture, commissioning, operation or delivery and maintenance. Improvement processes may include techniques, such as: • balanced scorecard • current and future state mapping • measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training
Constraints and contingencies	Contingencies arising during operations or improvement projects will have constraints on possible solutions. These may be: • financial • organisation procedural or culture • physical constraints, such as limits to resources, limits to site access or logistical limitations
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain
Lean manufacturing	Lean manufacturing uses cost, capacity and responsiveness, quality, reliability and waste minimisation as drivers of the process and measures for process improvement. Lean manufacturing is the response of many organisations to local, regional, national and global market competitiveness
Software options	Software may be employed for forecasting, scheduling performance analysis/modelling and may include: • ERP • SCADA

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	• spreadsheets
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer

Unit Sector(s)

Competency field

Unit sector Management and organisation

Custom Content Section

Not applicable.

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MEM22015A Source and estimate engineering materials requirements

Modification History

Release 1 - New unit. Replaces MEM22006A, but not equivalent.

Unit Descriptor

This unit of competency covers the skills and knowledge required to locate and approve a materials source and estimate materials requirements against a specification or bill of materials for engineering-related operations. This includes consideration of quantities, quality and capacity of suppliers to supply in accordance with a supply plan.

Application of the Unit

The unit applies to sourcing and estimating within an engineering operation or along a value chain and can be applied to individual or team-based work. It is suitable for people working in engineering or related industries in planning, purchasing or quantity surveying functions.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

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Elements and Performance Criteria

1	Participate in planning and budgeting for materials resourcing in engineering operation or project	1.1	Participate in planning for materials resourcing in the context of operations, project, strategic and business plans and budgets
		1.2	Contribute to management processes, such as costing and value engineering, feasibility studies, cost-benefit and break even analysis, consideration of contract law pertaining to supply arrangements and life cycle costing
		1.3	Evaluate sustainability implications of materials and components being sourced
		1.4	Participate in the selection or development of materials information systems
		1.5	Review suitability of software packages for materials estimation and sourcing and related purposes
2	Estimate quantities	2.1	Consult with operations and project teams regarding their materials needs
		2.2	Estimate quantities against operations or project specifications, drawings and bill of materials documents
3	Contribute to the development of supply chain relations	3.1	Contribute to supply chain requirements, evaluation and management
		3.2	Assist in developing tender and contract documents
4	Locate source and confirm material suppliers	4.1	Locate source and evaluate materials suppliers against specifications
		4.2	Evaluate supply agreements, quality and delivery parameters against operation or project requirements
		4.3	Coordinate approval of samples, testing and certification in accordance with specification requirements
		4.4	Confirm or recommend suppliers according to enterprise procedures

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5	Monitor and review materials and supply chain	5.1	Participate in development of performance indicators or parameters for materials supply chain
		5.2	Consult, negotiate and cooperate with suppliers in relation to supply chain efficiency improvements
		5.3	Provide feedback on quality, efficiency and continuous improvement processes to supply chain members and internal stakeholders
		5.4	Identify and monitor work health and safety (WHS) and regulatory requirements related to materials supply, transport, handling, storage and processing
		5.5	Monitor sustainability of sourced materials and coordinate responses in accordance with sustainability policy and procedures
		5.6	Apply systems thinking, constraints and contingency management, as necessary, and continuous improvement techniques
6	Report and document outcomes	6.1	Provide reports on material sourcing in accordance with procedures
		6.2	Maintain documentation on estimations, sources of supply, supply chain analysis performance, continuous improvement and training, WHS and regulatory requirements, and risk assessment

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- planning for materials resourcing
- estimating quantities, sourcing and evaluating materials suppliers against operations or project, specifications, drawings and bill of materials
- cooperating, communicating and negotiating effectively within team and functional groups, customers and suppliers
- monitoring and evaluating purchasing budget, expenditure and cash flow, sourcing of

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materials, sustainability implications, supply agreements and suppliers for quality, capacity and flexibility, conformance to regulatory requirements and test procedures
- using materials sourcing and planning software packages
- contributing to organisational management processes and materials supply chain management
- developing or using materials supply tender and contract documents
- interpreting materials requirement and purchasing schedule, purchasing budgets, and performance indices for materials supply chain
- coordinating responses to budget and delivery supply threats related to materials purchases
- participating in setting and implementing supplier payment policies
- implementing systems thinking, concurrent engineering, continuous improvement, contingency and constraint management, problem solving and decision making
- determining implications for materials sourcing of WHS, risk management, codes of practice, and sustainability policy and requirements
- reporting and documenting results of evaluations, tender analysis, and so on

Required knowledge

Required knowledge includes:

- planning procedures for materials resourcing in the context of operations, project, strategic and business plans and budgets
- use of systems and software packages to assess materials requirements information, data processing, bill of materials, estimating, supplier database and purchasing budget control
- systems for cost estimation and planning, value engineering, feasibility studies, cost-benefit analysis, life cycle costing and valuation
- supply chain management and value analysis, performance indices or parameters, and monitoring processes
- tender and contract documents, supply agreements, quality and delivery parameters, and terms of payment
- supply chain communications, feedback on quality, supply chain efficiency and continuous improvement processes
- sustainability policy and procedures
- WHS, regulatory and risk management requirements with particular emphasis on handling and use of resources
- WHS and regulatory compliance requirements, material safety data sheets (MSDS), test results, and risk management related to handling and storage
- use of systems thinking, constraints and contingency management, problem solving and decision making, and continuous improvement techniques

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to source and estimate materials for an engineering operation, including interacting with the supply chain. It includes planning and estimating supplies and integrating purchasing into operations. This includes working individually and as part of a team and recognising and complying with normal control procedures on engineering projects.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • plan for materials resourcing • estimate quantities, source and evaluate materials suppliers • develop tender and contract documents, materials requirement and purchasing schedule, purchasing budgets, and performance indices for materials supply chain • participate, communicate, cooperate, and negotiate with stakeholders on policy and procedures development and implementation • monitor supply of materials against contract requirements and key performance indicators (KPIs) • contribute to organisational management processes, and materials supply chain management.
Context of and specific resources for assessment	• This unit may be assessed on the job, or a combination of both on and off the job. The candidate should have access to a workplace where the engineering-related production or project processes and volume of materials used enable the materials sourcing skills covered by this unit to be realistically assessed. Where part of assessment occurs off the job a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

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Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Sustainability implications	Sustainability implications for sourcing and estimating materials in engineering or engineering-related operations may include taking account of: • resource consumption • energy consumption and conservation • processing needs • minimisation and processing of waste • transport • distribution • life cycle • reuse, recycle and disposal
Materials	Materials covered by this unit are those required for the ongoing

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	production or performance of an engineering-related project or operation and must meet an engineering specification and for which the delivery must be coordinated with a production or project schedule. The materials will typically be subject to formal supplier agreements or contracts and delivery is to specified cost, times, quality and quantities
Supplier performance	Supplier performance may include: • cost • delivery reliability • conformance to quality and quantity specifications • conformance to contract and regulatory requirements • participation in efficiency improvement processes • flexibility
Software packages	Software packages may include: • spreadsheets • databases • word processor • presentation • project management and cost control • system control and data acquisition (SCADA), MRPII and enterprise resource planning (ERP)
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain
Constraints and contingencies	Contingencies and constraints may include: • financial • sudden changes to schedules or delivery by a supplier • organisational, procedural or cultural • physical constraints, such as limits to resources, limits to site access or logistical limitations
Continuous improvement	Improvement processes may include techniques, such as: • balanced scorecard

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implementation	• current and future state mapping • measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training
WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Standards and Codes	Standards and codes refer to all relevant Australian and international standards and applicable codes
MSDS	Organisations using or storing hazardous substances or dangerous goods are required to maintain a MSDS and dangerous goods register. Manufacturers or importers of hazardous substances are obliged to provide an MSDS whenever the substances are first supplied to a customer

Unit Sector(s)

Competency field

Unit sector Management and organisation

Custom Content Section

Not applicable.

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MEM22017A Coordinate continuous improvement and technical development

Modification History

Release 1 - New unit. Replaces MEM22008A, but not equivalent.

Unit Descriptor

This unit of competency covers the skills and knowledge required to coordinate continuous improvement and ongoing technical development activities for engineering-related operations or projects. It includes feasibility studies, proposals for the introduction of technology or process change and development of implementation strategy, costing and budgets relating to proposals.

Application of the Unit

This unit applies to people with delegated coordination and facilitation responsibilities for implementing engineering-related continuous improvement change and technical development within organisations.

It does not cover design or implementation of major change, such as re-engineering or design and commissioning of new major plant. It is suitable for people working in engineering or related environments in design, maintenance or in operational functions.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential Performance criteria describe the performance needed

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outcomes of a unit of competency. to demonstrate achievement of the element.

Elements and Performance Criteria

1	Evaluate project or operations for improvement and technical development opportunities	1.1	Select project or operation for review in conjunction with stakeholders
		1.2	Determine current performance of operations or projects against objectives and key performance indicators (KPIs)
		1.3	Establish and monitor processes to identify shortfalls in performance and root causes
		1.4	Establish and monitor processes to identify possible opportunities for performance and technical improvements
		1.5	Evaluate hardware and software technology requirements for performance improvement opportunities
		1.6	Evaluate personnel skill requirements and training needs for performance improvement opportunities
		1.7	Confirm current or future work health and safety (WHS) requirements, codes of practice, regulations, standards and regulatory requirements related to possible opportunities for performance improvement
2	Develop recommendations for performance improvement and technical development	2.1	Coordinate the specification of options for performance improvement, including required technology changes, skills development needs, timelines, budget and extent of disruption to current operations
		2.2	Coordinate feasibility analyses on options and develop firm proposals
		2.3	Prepare report and recommendations, including objectives, implementation schedule, budget and any required regulatory compliance measures
		2.4	Communicate and negotiate with stakeholders to confirm recommendations for change and technological

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			developments
3	Coordinate implementation of approved changes	3.1	Develop implementation objectives, plan, schedule and budgets for approved changes
		3.2	Monitor implementation of objectives by priority, strategy and schedule
		3.3	Coordinate change management, process redesign and introduction of technology
		3.4	Manage physical and financial resources and budget within delegation
		3.5	Monitor change and technological development for compliance with organisational policies and procedures
		3.6	Assist with risk management procedures
4	Report outcomes	4.1	Record progress and results in accordance with procedures
		4.2	Provide documentation, data entry and analysis, as required

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying current objectives and performance measures
- identifying change and development opportunities
- evaluating technologies, plant and other assets, hardware and software used by current operations and projects
- identifying skills, knowledge and techniques for operations or projects
- completing feasibility analyses on options and developing of proposals
- maintaining relevant records of plans, priorities, schedules and progress, legislative compliance, personal and team skills development, and sources of technical information and resources

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- setting and coordinating priorities, strategy and schedule for changes, including introduction of new technology and continuous improvement operational changes
- problem solving and decision making, systems thinking, constraints and contingency management, short-term planning adjustments, and rescheduling physical and financial resources and budget within delegation
- communicating and negotiating with stakeholders, team members, support function groups, expert technical and professional assistance, customers and suppliers
- monitoring change and technological development for compliance with regulatory requirements
- reporting and documenting progress and results, data and analysis in accordance with procedures

Required knowledge

Required knowledge includes:

- project management techniques
- modern production management techniques
- context of operations, such as competitive pressures or markets, customer-supplier relationships, regulatory and industrial environment, environmental and sustainability, and resourcing and labour issues
- operations or project management structure, functional team relationships, responsibilities and delegations across the organisation, available technical and professional support services, communications and reporting lines
- procedures for audit of technologies, skills, knowledge and techniques, plant and other assets, including hardware and software used by current operations and projects
- feasibility analysis or ‘trade-off’ methods to assist selection from among options
- accountability and record keeping requirements in accordance with organisational procedures
- tendering and contract requirements and processes and their effect on continuous improvement, including agreement on design and specification, negotiations and optimisations, provisions for variations, delays and penalties
- change and technological development implications for WHS requirements, codes of practice, regulations, standards and regulatory requirements related to proposed changes and technologies
- sustainability issues related to continuous improvement of engineering-related projects and operations
- typical software for program management and budget control, use and validation options
- implementation plan, strategic and prioritised objectives and budgets
- procedures for reporting and recording of progress and records of legislative compliance in accordance with procedures for accountability against objectives, schedule and budget
- requirements for and functions of technical documentation, graphics and specifications and records of meetings, communications and agreements with stakeholders

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to review an existing engineering-related operation or project, including current context and performance objectives, and to identify and implement continuous improvements and technical developments. This includes working individually and in a team environment and recognising and complying with normal control procedures on engineering projects.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • evaluate technologies, assets, workforce and contractor skills and knowledge, personnel development strategies, hardware and software technology requirements, for technology and capability gaps and opportunities for improvement • review organisation structure, current operations and context, development opportunities, budgets and constraints, software options for opportunities for improvement • complete feasibility analyses on options and develop proposals • maintain appropriate documentation and records • demonstrate systems thinking, constraints and contingency management, short-term planning adjustments and rescheduling • manage physical and financial resources and budget within delegation • communicate and negotiate with stakeholders • report and document progress and results, data and analysis in accordance with procedures.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with

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	disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Stakeholders	Stakeholders may include: • enterprise or project owners and managers • team members • support function groups • expert technical and professional assistance • customers and suppliers • colleagues identified in reporting arrangements for the engineering project or operation
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to

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	perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain
Constraints and contingencies	Constraints and contingencies may include: • financial • organisational, procedural or cultural • physical constraints, such as limits to resources, limits to site access or logistical limitations
Organisational policies and procedures	Organisational policies and procedures may include formal policy documents, operational procedures, mission statements, training manuals, orders, production schedules, safety instructions and notices, and may reference: • enterprise agreements and awards • WHS requirements • codes of practice and other legislative requirements • environmental and social obligations • ethical practice
WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to the engineering project or operation
Continuous improvement implementation	Continuous improvement implementation may relate to plant, products, processes, systems or services, including design, development, implementation or manufacture, commissioning, operation or delivery and maintenance. Improvement processes may include techniques, such as:

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	• balanced scorecard • current and future state mapping • measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer
Lean principles	Lean manufacturing uses cost, capacity and responsiveness, quality, reliability and waste minimisation as drivers of the process and measures for process improvement. Lean manufacturing is the response of many organisations to local, regional, national and global market competitiveness

Unit Sector(s)

Competency field

Unit sector Management and organisation

Custom Content Section

Not applicable.

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MEM22018A Coordinate sales and promotion of engineering-related products or services

Modification History

Release 1 - New unit. Replaces MEM22009A, but not equivalent.

Unit Descriptor

This unit of competency covers the skills and knowledge required to coordinate sales and promotion of engineering-related products or services requiring engineering knowledge. The unit covers ensuring appropriate technical advice is provided to clients, contribution and participation in strategic planning and sales budget setting, control of sales costs against budgets, and responsibility for meeting sales performance indices. It includes a requirement to provide feedback on customer satisfaction and seek out opportunities for improvements.

Application of the Unit

This unit applies to people with coordination responsibilities for sales and promotion of products or services that require engineering knowledge. It is suitable for people working in marketing and sales where detailed engineering-related advice must be provided or where technically advanced products or services are sold.

Prior or concurrently developed competence in personal and electronic communication, self-directed and group activities, planning and scheduling, process improvement, performance analysis, and an understanding of technology, skills and techniques required by operations and projects is required.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Review organisational operations, markets and customer base	1.1	Define sales, service and marketing strategic objectives for engineering-related products or services
		1.2	Establish nature and context of products or services, including market potential, technical advantage, customer-supplier relationships and relevant regulatory requirements
		1.3	Review functional team relationships and organisational fit, available technical and professional support services, communications and reporting lines
		1.4	Review sustainability and life cycle implications of products and services
		1.5	Review legal obligations of organisation and team related to consumer protection, trade practices, environmental and commercial legislation related to product or service delivery
		1.6	Identify relevant organisation accounts and budgets and establish procedures for compliance
		1.7	Identify available software for marketing and sales operations
2	Coordinate sales, service and promotions activities	2.1	Establish implementation plan, schedule and budgets to achieve promotional and sales objectives
		2.2	Establish procedures to record progress against objectives, schedule and budget
		2.3	Participate in and supervise engineering-related sales, service and promotions with stakeholders, including

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			customers
		2.4	Establish processes to ensure self and team maintain currency of technical knowledge of organisation's products and services
		2.5	Establish continuous improvement of sales and promotion activities
3	Monitor sales and promotion activities	3.1	Communicate and negotiate with stakeholders to establish organisational capability, feedback on improvement opportunities and customer needs, marketing opportunities, and development needs of sales and marketing team
		3.2	Address constraints and contingencies, and adjust short-term planning and reschedule, as necessary
		3.3	Monitor implementation of objectives by priority, strategy and schedule
4	Report outcomes	4.1	Record progress and results in accordance with procedures
		4.2	Provide documentation, data entry and analysis, as required

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- planning, scheduling and budgeting to achieve promotional, sales and service objectives
- investigating and evaluating options for sales, promotions and marketing team development and training
- identifying technical and market advantage for products or services, regulatory and industrial relations environment
- establishing customer-supplier relationships, current markets and context, marketing and sales opportunities, and constraints

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- coordinating implementation of objectives, sales and promotions, personal and team training, continuous improvement, problem solving and decision making
- monitoring marketing team performance
- identifying awards, enterprise agreements personnel entitlements and remuneration arrangements that may impact on technical sales and promotion team activities
- maintaining records
- systems thinking, constraints and contingency management, short-term planning adjustments and rescheduling, marketing team resources and budgeting
- communicating and negotiating with stakeholders
- monitoring products and services for change or change opportunities
- monitoring of team compliance with relevant regulations, including enterprise agreements or awards, WHS, codes of practice, trade practices and consumer law, other legislative requirements, social and economic obligations, and ethical practice
- reporting and documenting progress and results, data and analysis in accordance with procedures

Required knowledge

Required knowledge includes:

- engineering knowledge relevant to operations and supplied products and services context of marketing and sales, such as competitive pressures or markets, customer-supplier relationships and consumer protection legislation
- organisational management structure, functional team relationships, available technical and professional support services, communications and reporting lines
- audit procedures for personnel current competence, competence gaps and training requirements within marketing team
- opportunities for technological and personnel competence improvement
- sustainability implications of products and services
- organisation mission and business strategy, operations and project plans and objectives
- opportunities and constraints related to sales and promotions
- techniques for analysis of organisational capability, current and future technological needs of customer base, and marketing opportunities
- software options for program management and budget control
- WHS, codes of practice, and other legislative requirements, sustainability and ethical practice related to products and services, marketing team changes and developments
- risk management procedures
- procedures for reporting and recording of progress and records
- legal obligations of organisation and team related to employment conditions, consumer protection, trade practices, environmental and commercial legislation related to procedures

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to coordinate sales of products or services where such sales require engineering-related knowledge and skills, including establishing performance objectives and identifying and implementing continuous improvement.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • define sales and marketing organisational mission and strategic objectives, features and functions within the organisation • plan, schedule and budget to achieve promotional and sales objectives • identify technical and market advantage for products or services, customer-supplier relationships, current markets and context, marketing and sales opportunities, and constraints • investigate and evaluate options for sales, promotions and marketing team development, and complete feasibility analysis on marketing options • maintain records of plans, priorities, schedules and progress, legislative compliance, and personal and team skills development • coordinate implementation of objectives, sales, marketing and promotions, personal and team training, continuous improvement, problem solving and decision making, systems thinking, constraints and contingency management, short-term planning adjustments and rescheduling, and marketing team resources and budget • communicate and negotiate with stakeholders monitor products and services • report and document progress and results, data and analysis in accordance with procedures.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to

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	work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Personal responsibilities	Personal responsibilities may be defined by: • role specification • workplace agreement or award • negotiation • contract, legal or regulatory obligations • professional and ethical considerations

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	• agreed operational or project requirements
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain
Constraints and contingencies	Constraints and contingencies may be: • financial • organisational, procedural or cultural • physical constraints, such as limits to resources, limits to site access or logistical limitations
WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Legal obligations	Legal obligations may include: • contract law • commercial law • company law • consumer protection Acts and Commonwealth Trade Practices Acts and Regulations • environmental Acts • tax Acts and regulations, including GST and other sales-related provisions • industrial law, including relevant awards and agreements WHS Act and regulations
Sustainability	Sustainability is used to mean the entire sustainable performance of

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	the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer
Continuous improvement implementation	Continuous improvement implementation may relate to products or services being sold, including: • sales operation • product delivery and maintenance • measuring performance against benchmarks • process improvement • problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training

Unit Sector(s)

Competency field

Unit sector Management and organisation

Custom Content Section

Not applicable.

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MEM23003A Operate and program computers and/or controllers in engineering situations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers operating computers and/or controllers in industrial situations and preparing and maintaining programs.

Application of the Unit

Application of the unit	This unit applies to operating and programming computers &/or controllers in industrial situations. It includes operating computer/controller hardware and software for engineering tasks; developing or customising computer/controller systems or programs. This unit only has application in qualifications that are not points based. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM16008A	Interact with computing technology

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Operate a computer and/or controller system	1.1. Operate a range of hardware to complete engineering tasks. 1.2. Use appropriate software to produce required outcomes. 1.3. Identify and use available sources of help to overcome basic difficulties with applications. Ensure technical instructions are followed and inconsistencies and technical difficulties investigated and resolved. This should include adherence to occupational health and safety regulations / guidelines.
2. Develop/customise computer and/or controller systems/programs	2.1. Work plan for the programming/customising task is prepared in accordance with organizational guidelines. 2.2. Programs are written/altered/customised in the required format and computer language. Develop

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ELEMENT	PERFORMANCE CRITERIA
	and maintain client engagement with project or task. 2.3. Program/system records are maintained and made available to all interested parties following company procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • completing tasks using selected hardware in accordance with manufacturer's instructions and to workplace procedures • using CPU, I/O, peripherals, interfaces, actuators and other computer/controller equipment • accessing and using appropriate software in accordance with manufacturer's instructions to complete task requirements • saving and storing documents and other computer/controller files are in an appropriate directory in accordance with manufacturer's instructions and workplace procedures • identifying and analysing difficulties using appropriate help sources • preparing work plans for programming/customising task • writing/altering/customising programs • testing and amending programs • maintaining records
Required knowledge
Look for evidence that confirms knowledge of: • functions and operating procedures of CPU, I/O, peripherals, interfaces, actuators and other computer/controller equipment • applications of available hardware and criteria for selecting the hardware for particular tasks • procedures for operating hardware • procedures for checking and replacing hardware consumables • available software and their applications

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REQUIRED SKILLS AND KNOWLEDGE
• procedures and commands for the use of identified software • procedures and related requirements for saving and storing documents and computer/controller files • techniques for accessing, transferring, printing documents or other computer files or using computer files to control plant and equipment • techniques for accessing and using manuals and training booklets to solve minor problems • procedures for accessing sources of help • techniques for accessing help with typical difficulties with selected applications • typical programming/customising sequencing and related issues • techniques and procedures for preparing a work plan for a programming/customising task • techniques and procedures for writing/customising programs in specified formats and computer language • techniques and procedures for testing and amending programs • procedures for checking program alteration with users • procedures for maintaining records and reports on program/system development or enhancement • procedures for disseminating information on program/system development

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to operate and program computers and/or controllers in engineering situations. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for	This unit may be assessed on the job, off the job or a

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EVIDENCE GUIDE	
assessment	combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with operating and programming computers and/or controllers in engineering situations or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying calculus in engineering situations or other units requiring the exercise of the skills and knowledge covered by this unit.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Hardware	Personal computers, networked systems, personal organisers, communications equipment, PLC and microprocessor controllers, computer controlled machinery and systems, etc.

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RANGE STATEMENT	
Tasks	To be carried out under appropriate supervision using predetermined standards of safety, computer application and technical analysis
Software	Commercial software applications, CAD and CAM software, organisation specific software, PLC or microprocessor controller software, word processing, spreadsheet, database, graphic, communication packages and presentation packages, etc
Technical instructions	Manufacturer's and organisational instructions for use of specific computer hardware
Inconsistencies and technical difficulties	Resolved in consultation with appropriate technical advisers
Occupational health and safety regulations / guidelines	Screen based equipment, computing equipment and peripherals and ergonomic work stations, etc.
Programming	Visual Basic, Ladder Logic, Flow Chart, program customising, spreadsheet programming, writing macros, setting up/varying databases and the like.
Organisational guidelines	Security procedures, OH&S procedures, maintenance procedures, etc.
Develop and maintain client engagement	Ongoing communication with clients required to ensure that engineering services are effectively delivered

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units	

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Co-requisite units		

Competency field

Competency field	Engineering science

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MEM23004A Apply technical mathematics

Modification History

Release 1 - New unit. Replaces MEM23001A, but not equivalent.

Unit Descriptor

This unit of competency covers the application of mathematical analysis, graphical and software techniques to engineering problems. It includes exponential and logarithmic functions, trigonometric equations involving single and double angles, sequences and series, two dimensional vector analysis, complex numbers, determinants and matrices.

Application of the Unit

The unit applies to engineering or related activities requiring specific mathematical techniques. It is suitable for people giving technical support to design, operations or maintenance activities and those pursuing technical qualifications and careers at paraprofessional or technician level.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

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Elements and Performance Criteria

1	Determine scope of technical mathematical techniques required for an engineering application	1.1	Analyse an engineering application for required technical mathematical tasks
		1.2	Develop systematic methods for layout and solution checking
		1.3	Determine mathematical software required for analytical and graphical solutions and validate software using traditional solutions to simple examples
2	Apply technical mathematical techniques to engineering application	2.1	Use appropriate software for analytical and graphical solutions
		2.2	Convert between different number systems
		2.3	Use appropriate mathematical techniques required for analysis and solution
		2.4	Use appropriate data representations to communicate the solution to others.
		2.5	Report results and document calculations, graphs and analysis

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- solving mathematical problems using standard engineering software packages, and validating software results of simple examples analytically and/or graphically
- manipulating values using decimal, binary and hexadecimal number systems
- graphing and analysing functions for solutions:
  - exponential and logarithmic functions
  - trigonometric functions
- using the techniques of sequences and series to solve simple mathematical problems
- using the techniques of two dimensional vectors to solve mathematic and applied problems
- solving problems involving complex quantities using the properties, operations and theorems

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of complex numbers
- using determinant and matrix analysis to solve algebraic and vectorial problems
- using probability to assess likely occurrences

Required knowledge

Required knowledge includes:

- software for mathematical analysis and graphical representations
- binomials and polynomials
- exponential and logarithmic functions
- trigonometric equations
- sequences and series
- two dimensional vectors
- complex numbers
- determinant and matrices
- probability
- stability analysis using plots

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to apply mathematical analysis, graphical and software techniques to engineering-related problems within the context of delegations and other checking and technical oversight procedures. The candidate may demonstrate competence through either working individually or as part of a team.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • solve mathematical problems using software • validate software results of simple examples analytically and/or graphically • manipulate values using decimal, binary and hexadecimal number systems • graph and analyse exponential, logarithmic and trigonometric functions for solutions • use the techniques of sequences and series to solve simple

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	mathematical problems • use the techniques of two dimensional vectors to solve mathematic and applied problems • solve problems involving complex quantities using the properties, operations and theorems of complex numbers • use determinant and matrix analysis to solve algebraic and vectorial problems • use probability to assess likely occurrences.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Engineering applications related to mathematical techniques in this unit	Most engineering disciplines will have applications supported by the technical mathematics skills described in this unit, including mechanical, manufacturing, maintenance and mechatronics engineering. Examples of engineering applications requiring mathematical skills described in this unit may include: • vector analysis of force systems on beams and bodies • trigonometric plots related to waveforms for amplitude, frequency and phase shift analysis • matrix and determinant solutions of vector systems or simultaneous equations • complex plane analysis of control systems for stability analysis
Scope of technical mathematical techniques	The scope of technical mathematical techniques required for an engineering application will vary and may include: • standard mathematical software • decimal, binary and hexadecimal number systems • graph exponential and logarithmic functions required for the engineering application • solve trigonometric equations involving single and double angles • solve problems using simple binomials and polynomials • solve problems involving simple sequences and series in the engineering application • analyse two dimensional vectors • analyse complex numbers and represent graphically • analyse simple algebraic and vectorial problems using determinants and matrices • evaluate probability as a predictive tool in simple situations
Number system	Number systems may include: • decimal • binary • hexadecimal

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Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23006A Apply fluid and thermodynamics principles in engineering

Modification History

Release 1 (MEM05v9).

Unit Descriptor

This unit of competency covers the application of fluid and thermodynamic principles to engineering applications. It includes sustainability issues; fundamental scientific principles; fundamentals of vacuum technology; properties of gases and liquids; heat transfer due to conduction, convection and radiation heat and compression processes; closed and open systems; continuity, enthalpy and energy transfers related to compressors, boilers, turbine heat exchangers, heat engines, refrigerators and heat pump performance. It also includes fluid systems and components, forces on floating and submerged bodies, turbine and pumping systems, and jet forces on blades and plates.

Application of the Unit

This unit applies to fluid and thermodynamic devices and systems used in industry. It is suitable for people working as technicians in engineering or related fields using hydrostatic, hydrodynamic, fluid power or heating, ventilation and air conditioning (HVAC) equipment and those pursuing careers and qualifications in engineering or related disciplines.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Determine scope of fluid or thermodynamic application	1.1	Determine compliance requirements of work health and safety (WHS) and regulatory requirements, codes of practice standards, risk assessment and registration requirements
		1.2	Review sustainability implications of fluid and thermodynamic tasks
		1.3	Assess fluid, thermodynamic and vacuum principles, skills and techniques required by tasks
		1.4	Review functions and features of fluid, thermodynamic and vacuum devices, machines and systems
		1.5	Assess software techniques required for analysis and graphics required by the task
2	Interpret fluid or thermodynamic system design for effective performance	2.1	Determine the energy cost for running boilers, heat engines, compressors or turbines over a billing period, the efficiency of conversion of energy source to electrical, fluid, thermal or mechanical power and the sustainability of the processes
		2.2	Select components for thermal and fluid systems ensuring compatible materials, pressure, temperature and flow capacity and appropriate performance
		2.3	Determine pumping system power requirements to provide for raising fluid, adequate flow rate and specified system losses
		2.4	Specify vacuum system components and performance requirements for moulding, dust removal, film deposition, chemical reaction control, and prove or test performance of specified system or individual components

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		2.5	Seek technical and professional assistance or clarification of design information, as required
		2.6	Ensure clear and logical process of specification development and compatibility of units in calculations
3	Report results	3.1	Record results of investigation, evaluation and application
		3.2	Provide documentation, such as calculations, diagrams, programs and files

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- determining and confirming parameters and context of tasks, personal responsibilities, team and support personnel relations, chain of responsibility, WHS, regulatory requirements, risk management and organisational procedures
- reviewing sustainability implications, functions and features of fluid, thermodynamic and vacuum devices, machines and systems
- assessing and applying fluid, thermodynamic and vacuum principles and software skills and techniques
- ensuring clear and logical process of specification development and compatibility of units in calculations
- reporting and documenting results of investigation, evaluation and application, calculations, diagrams, programs and files

Required knowledge

Required knowledge includes:

- definition of fluid mechanics and thermodynamics and recognition of applications
- analytical, graphical, semi-graphical and software assisted techniques for applications for fluid and thermodynamic principles in engineering
- energy and sustainability concepts relevant to fluid and thermodynamic applications
- principles of turbines and heat engines
- basic properties and concepts common to fluids and thermodynamics:

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  - atoms, molecules, inter-molecular forces, molecular motion, states of matter, solids, liquids, gases, basic properties and units
  - ideal or perfect gases and liquids
  - definitions
- energy types and concepts:
  - potential energy, kinetic energy and internal energy
  - chemical energy = energy content of a fuel
  - work, constant and variable force, relationship to pressure and volume changes
  - sensible heat and specific heat capacity (Cp and Cv)
  - phase change, latent heat, enthalpy and enthalpy diagram
- heat transfer processes
- concepts and properties of gases
- energy transfer in closed and open systems:
  - definition of a closed system
  - non-flow energy equation definition of an open system
  - mass and volume flow rate and the continuity equation
- fluid mechanics
- fluid system components
- fluid statics
- fluid dynamics
- fluid power
- vacuum technology:
  - definition of vacuum
  - states of matter
  - purposes of vacuums
  - degrees of vacuum
- methods of lowering pressure:
  - displacement or transfer of gas
  - sorption or condensation
- barometric pressure:
  - inverted mercury tube
  - variation of atmospheric pressure with altitude
- quantity of gas:
  - mole, Avogadro’s Number and molar mass
- types of vacuum pumps for evacuating volumes
- description of typical vacuum vessels, features and functions
- applications of vacuum technology in industry

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to apply fluid, thermodynamic and vacuum principles to the selection and evaluation of components and systems. This includes working individually and as part of a team and recognising and complying with normal control procedures on engineering projects.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • review sustainability implications, functions and features of fluid, thermodynamic and vacuum devices, machines and systems • interpret fluid, thermodynamic and vacuum system designs for industry applications • select components for specified technical performance • calculate energy use in fluid, thermodynamic and vacuum system • assess and apply fluid, thermodynamic and vacuum principles and software skills and techniques to engineering tasks.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering

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	Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Fluid and thermodynamic tasks	Fluid and thermodynamic tasks covered by this unit may include: • energy costs, efficiency and sustainability assessment of running boilers, heat engines, compressors or turbines • fluid and thermal system component selection • pumping and turbine system power evaluation • evaluating vacuum system components and performance requirements
Basic properties and units common to fluids and thermodynamics	Basic properties and units include: • mass, weight and force • volume, density, specific volume and relative density • pressure (absolute and gauge), and atmospheric pressure

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	variation • temperature (Celsius, Kelvin and others) • viscosity and surface tension • vapour pressure of a liquid (saturation vapour pressure) • temperature and pressure effects on properties • international system of units (SI) • fundamental dimensions and units • derived dimensions and units
Static and hydrodynamic devices or systems	Static and hydrodynamic devices or systems may include: • floating and submerged bodies • turbine and pumping systems • stationary or moving plates or blades • vacuum systems
Thermodynamic devices or systems	Thermodynamic devices or systems may include: • heat transfer devices • compressors • boilers • turbines • heat exchangers • heat engines • refrigerators • heat pumps

Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include:

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	• WHS Acts and regulations • relevant standards • codes of practice • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Enthalpy	Enthalpy is a thermodynamic property equal to the sum of the internal energy of a system and the product of its pressure and volume

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23007A Apply calculus to engineering tasks

Modification History

Release 1 - New unit. Replaces MEM23002A, but not equivalent.

Unit Descriptor

This unit of competency covers the application of calculus, including differentiation and integration techniques to engineering applications. It includes the use and application of standard differentiation and integration rules, finding maximum and minimum values of curves, application to rates of change and slope, finding definite integrals, using method of substitution, using trigonometric identities and finding areas under curves.

Application of the Unit

The unit applies to engineering or related activities requiring the application of mathematical techniques using calculus. It is suitable for people giving technical support to design, operations or maintenance activities and those pursuing technical qualifications and careers at paraprofessional or technician level.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

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Elements and Performance Criteria

1	Determine scope of calculus techniques required for an engineering application	1.1	Analyse an engineering application for required calculus tasks
		1.2	Develop systematic methods for layout and solution validation, including any required external sign-off of solution
		1.3	Identify calculus technique and any software required for analysis and resolution of identified engineering application tasks
		1.4	Identify sources for professional and technical assistance, if required
2	Apply differential techniques to engineering applications	2.1	Apply standard differentiation rules to solve engineering problems
		2.2	Check solution is laid out correctly and is error free
		2.3	Review solution to ensure it provides information relevant to resolution of engineering application task
		2.4	Report results and document calculations, graphs and analysis
3	Apply integration techniques to engineering applications	3.1	Apply standard integration rules to solve engineering problems
		3.2	Check solution is laid out correctly and is error free
		3.3	Review solution to ensure it provides information relevant to resolution of engineering application task
		3.4	Report results and document calculations, graphs and analysis

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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- analysing engineering applications to determine relevant calculus techniques
- applying relevant differentiation and integration concepts and tools to engineering applications
- using appropriate software and/or scientific calculators to generate solutions to statistical and probability-related engineering problems
- using differentiation to find rates of change
- applying special calculus techniques to solve more complex integrals, such as:
  - method of substitution
  - using trigonometric identities
- identifying and solving simple first and second order differential equations
- identifying key points to find constants of integration
- finding integrals of algebraic, trigonometric and exponential functions
- establishing appropriate procedures for checking and validating solutions
- logical layout and presentation of data developed using calculus
- reporting and effectively communicating the results of calculus-based analysis

Required knowledge

Required knowledge includes:

- identifying appropriate limits and applying to engineering problems being solved with calculus techniques
- differentiation rules and techniques
- partial differentiation
- relationship between differentiation and attributes of mathematical curves and graphs
- optimisation of variables based on maximum and minimum values of mathematical curves and graphs
- integration as the reverse of differentiation
- integration rules and techniques
- the definite integral

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to apply calculus techniques to engineering and related problems within the context of specified engineering applications and solution validation and technical oversight procedures. The candidate may demonstrate competence through either working individually or as part of a team.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • solve mathematical problems related to engineering and manufacturing using calculus techniques • validate results of mathematical problems using calculus either analytically and/or graphically • manipulate engineering and manufacturing-related mathematical functions and equations using calculus techniques • analyse mathematical problems by using appropriate calculus techniques to achieve engineering and manufacturing solutions.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units

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	of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Engineering applications related to calculus techniques in this unit	Most engineering disciplines will have applications supported by the calculus skills described in this unit, including mechanical, manufacturing, maintenance and mechatronics engineering. Examples of engineering or manufacturing applications requiring calculus skills described in this unit may include: • determining the point of maximum bending moment, slope and deflection for a beam • determining the depth of parabolic mirrors • determining moments of inertia of a range of engineering components • solving rectilinear motion problems
Scope of calculus techniques	The scope of calculus techniques required for an engineering or manufacturing application will vary and may include: • identification of appropriate limits • use of standard derivatives and rules • application of second and third derivatives • finding rates of change and slopes of curves • calculating maximum and minimum values of curves • solving first and second order differential equations • use of standard integrals and rules • finding constants of integration • finding areas under and between curves • integrating algebraic, trigonometric and exponential functions • the definite integral • identification of appropriate methods to solve more complex integration applications

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Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23041A Apply basic scientific principles and techniques in mechanical engineering situations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers applying basic scientific principles and techniques to appropriate mechanical and manufacturing engineering situations.

Application of the Unit

Application of the unit	This unit requires application of basic mechanical scientific principles and techniques as a member of a design and development team or similar in support of the design and development of mechanical and manufacturing applications. Applications include identifying the range of basic mechanical scientific principles and techniques relevant to mechanical and manufacturing engineering, selecting mechanical principles and techniques for particular applications, applying mechanical principles and techniques appropriately to engineering tasks, quoting results appropriately. This unit only has application in qualifications that are not points based. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Research and identify the range of basic mechanical scientific principles and techniques relevant to mechanical and manufacturing engineering	1.1. The basic mechanical scientific principles relating to mechanical and manufacturing engineering researched and reported on from appropriate sources of information and examination of applications. 1.2. The basic mechanical techniques and associated technologies, software and hardware required to implement scientific principles relating to mechanical and manufacturing engineering situations.
2. Select basic mechanical scientific principles and techniques relevant to	2.1. For particular mechanical and manufacturing engineering situations, the relevant basic mechanical scientific techniques and principles can be selected.

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ELEMENT	PERFORMANCE CRITERIA
particular mechanical and manufacturing engineering applications	2.2. For particular mechanical engineering situations, the relevant basic mechanical techniques and associated technologies, software and hardware can be selected.
3. Apply the relevant basic mechanical scientific principles and techniques appropriately	3.1. The basic mechanical scientific principles are applied in a consistent and appropriate manner to obtain any required solution. 3.2. Appropriate calculations and coherent units are used in the solution of engineering calculations. 3.3. Significant figures are used in engineering calculations. 3.4. The basic mechanical techniques and associated technologies, software and hardware are applied in a consistent and appropriate manner to obtain required solutions.
4. Quote the results of the application of the basic mechanical scientific principles and basic techniques correctly	4.1. For applications involving engineering calculations the solution is quoted in an appropriate style. 4.2. For applications not involving engineering calculations the solution is quoted in an appropriate style.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • selecting appropriate basic mechanical scientific principles have been chosen to suit specific applications • selecting appropriate basic mechanical techniques and associated technologies, software and hardware to suit specific applications • applying basic mechanical scientific principles to particular engineering situations • applying and manipulating appropriate formulas for applications involving engineering calculations • applying appropriate calculations to engineering situations • checking the validity of equations is using dimensional analysis

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REQUIRED SKILLS AND KNOWLEDGE
• applying basic mechanical techniques and associated technologies, software and hardware in a manner appropriate to the application and identified scientific principles. • referring solutions to the original aim of the application. • quoting solutions in appropriate units, using appropriate significant figures. • quoting limitations of solutions, due to assumptions, scientific principles and techniques used • presenting solutions referring to the original aim of the application.
Required knowledge
Look for evidence that confirms knowledge of: • basic mechanical scientific principles • limitations of selected basic scientific principles • basic mechanical techniques and related technologies, software and hardware associated with implementing scientific principles in mechanical engineering solutions • the limitations of basic techniques and associated technologies, software and hardware • the applicability and limitations of basic mechanical scientific principles • the applicability and limitations of basic mechanical techniques and associated technologies, software and hardware • appropriateness of calculations • fundamental and derived quantities • common systems of units • the procedure for converting between systems of units • common prefixes used with units and their values • the procedure for carrying out dimensional analysis • the concept of significant figures • the uncertainty of computations based on experimental data • the procedures for determining the significance of figures in calculations • the procedures for estimating errors in derived quantities

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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EVIDENCE GUIDE	
Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply basic scientific principles and techniques in mechanical engineering situations.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying basic scientific principles and techniques in mechanical engineering situations or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Sources of information	Reference texts, manufacturer's catalogues and industrial magazines, websites, use of phone, email and fax information gathering.
Basic mechanical scientific techniques and principles	• Candidates should apply appropriate basic techniques supported by their mathematical skills and introductory knowledge of scientific principles to design, manufacturing and commissioning related tasks and projects. The applications may require the use of one or two basic mechanical scientific principles together with a fundamental mathematical calculation leading to process, resources and system choices from a limited range of options. • Basic techniques include basic hand and power tool operations, machining, fitting, welding, moulding, fabricating, wiring and programming techniques.
Mechanical engineering	The engineering discipline concerned with the conceptual development, research, design, manufacture, implementation, installation, commissioning and maintenance of mechanical products, processes, systems or services for converting energy into power and motion, materials into product and components into machines and systems for domestic, industrial, public or private services, entertainment and military applications.

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering science

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MEM23063A Select and test mechanical engineering materials

Modification History

Release 1 - New unit. Replaces MEM23061A, but not equivalent.

Unit Descriptor

This unit of competency covers the skills needed to interpret design information for material and material test requirements, select appropriate tests and use results in the selection of appropriate materials for mechanical and manufacturing engineering-related applications.

Application of the Unit

This unit applies to the selection of materials and material tests, sourcing materials data, ensuring appropriate performance and physical standards for mechanical and manufacturing applications, documenting materials tests, and ensuring calibration standards. The unit applies to mechanical and manufacturing engineering applications in mass production, batch production, jobbing shop and prototyping.

Activities may be performed as a member of a design and development team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23109A	Apply engineering mechanic principles

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Distinguish classes of materials, based on properties and materials tests, relevant to mechanical and manufacturing engineering	1.1	Relate material properties to common mechanical and manufacturing engineering methods and processes
		1.2	Identify common characteristics, faults or flaws in materials, components and product
		1.3	Identify engineering-related test methods for materials and components or product properties
		1.4	Identify common industrial test standards/codes, calibration requirements, regulations and authorities relevant to selection of materials and products for mechanical and manufacturing engineering applications
2	Utilise sources of information on engineering materials, materials tests and test equipment	2.1	Review design information for material specifications and required material tests
		2.2	Identify and use appropriate sources of information on materials, material tests and test calibration
		2.3	Identify and use appropriate sources of information on methods of testing of properties of materials
		2.4	Investigate and report on relevant standards and codes
		2.5	Identify and use appropriate sources of information on materials safety data sheets (MSDS)
		2.6	Establish availability of technical and professional assistance
3	Test for or obtain the properties of engineering	3.1	Specify required materials tests and manage implementation of tests to ensure quality, safety and suitability for applications

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	materials	3.2	Ensure traceability of measurement standard
		3.3	Obtain test sheets/certificates for appropriate materials for applications in accordance with organisational procedures and/or codes and regulations
		3.4	Obtain appropriate MSDS for applications in accordance with organisational procedures and/or codes and regulations
4	Select and implement materials for mechanical/ manufacturing engineering applications	4.1	Select materials for use in given mechanical or manufacturing engineering applications based on relevant test information
		4.2	Incorporate materials and components into mechanical and manufacturing processes in accordance with design functional requirements
5	Document materials design data and methods and results of materials tests	5.1	Report and record materials selections against design functional requirements in accordance with organisational procedures, codes and regulations
		5.2	Undertake any required environmental impact and sustainability assessment
		5.3	Report and record materials tests and test sheets or certificates in accordance with organisational procedures, codes and regulations, including appropriate calibration and traceability
		5.4	Report and record appropriate MSDS for applications in accordance with organisational procedures, codes and regulations

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

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- selecting class of materials for an application based on comparison of properties for a significant range of materials classes
- selecting class of materials for an application suitable to mechanical and manufacturing engineering-related methods and processes
- identifying common characteristics, faults or flaws in materials
- identifying test methods for properties of, and faults and flaws in, materials and components
- identifying industrial test standards and regulations for materials and particular engineering applications
- selecting the most appropriate tests and test methods from a range of possible tests
- identifying and applying standards and regulations for materials and components
- sourcing and using materials test sheets and certificates
- sourcing and implementing MSDS
- implementing tests correctly for materials and component properties and faults
- interpreting design documentation for materials and materials testing requirements
- applying environmental and sustainability requirements to material selection
- reporting, recording and filing test reports and documentation
- implementing materials tests and test sheets/certificates, test calibration and traceability

Required knowledge

Required knowledge includes:

- properties of materials classes
- the effect of material properties, faults or flaws on mechanical and manufacturing engineering methods and processes
- test methods and procedures for materials and components, including specific industrial test standards, regulations and authorities related to particular engineering applications
- test methods for faults or flaws in materials and components or product
- sources and uses of information on materials and materials tests, including test certificates, regulations, standards, regulatory bodies and industrial authorities
- methods of accessing MSDS
- significance of test sheets/certificates to applications
- significance of MSDS and relevance of procedures
- materials selections in relation to design functional requirements
- environmental impact and sustainability assessment
- significance of test procedures, reports and documentation to applications, including the need for obtaining and filing test sheets and certificates
- significance of test calibration and traceability

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

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performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to select and test mechanical engineering materials.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • review design information for materials and materials test requirements • select classes of materials relevant to design for further research, testing and evaluation • identify standards, codes and regulatory requirements relevant to materials testing and application • specify appropriate tests and interpret test results for material selection • select materials consistent with test results and design and regulatory requirements • ensure traceability in material selection process • correctly document all results and tests.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. • This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with selecting and testing mechanical engineering materials or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning

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	knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Classes of materials	Classes of materials include: • non-ferrous metals and alloys • ferrous metals • non-metals (e.g. timber, concrete, ceramics, polymers and fabrics, adhesives and lubricants) • thermal and electrical conductors and insulators
Properties and characteristics of materials	Properties and characteristics of materials may include: • physical properties (e.g. strength; elasticity; plasticity; malleability; hardness; toughness; brittleness; fatigue endurance; mouldability; weldability; machinability; formability; resistance to creep and stress relaxation; resistance to degradation, such as use of plastic fillers to enhance UV resistance; adhesion; electrical, magnetic, thermal, chemical and optical; material structure and effect on properties • susceptibility to corrosion • conductivity and resistance – both thermal and

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	electrical • the effect of manufacturing and construction processes on material properties
Mechanical engineering	Mechanical engineering is the engineering discipline concerned with the conceptual development, research, design, manufacture, implementation, installation, commissioning and maintenance of mechanical products, processes, systems or services for converting energy into power and motion, materials into product and components into machines and systems
Manufacturing engineering	Manufacturing engineering includes conceptual development, design, manufacture, construction, implementation, installation, optimisation, commissioning and maintenance of resources and processes employed for the manufacture of product and components, machines and systems
Sources of information	Sources of information may include: • standards and codes • MSDS • reference texts • manufacturer catalogues and other published information • regulatory bodies • technical, professional and industrial associations and societies
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to the mechanical engineering analysis task
Tests of materials	Tests of materials include: • destructive, including tensile, compression, impact, hardness, fatigue, corrosion, stress relaxation and creep, fatigue and peel resistance (adhesives) • non-destructive, including hardness, ultrasonics, X-ray, die penetrant, eddy current, surface friction, conductivity, heat expansion, photoelastic, heat capacity refractive index and magnetic hysteresis loop
Traceability	Test calibrations can be traced back to the relevant base unit in the relevant measurement system

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Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23064A Select and test mechatronic engineering materials

Modification History

Release 1 - New unit. Replaces MEM23062A, but not equivalent.

Unit Descriptor

This unit of competency covers the skills and knowledge needed to interpret design information for material and material test requirements, select appropriate tests and use results in the selection of appropriate materials for mechatronic engineering-related applications.

Application of the Unit

This unit applies to the selection and implementation of materials and material tests relevant to mechatronic, maintenance, electronic, electrical, instrumentation and control engineering, including identifying sources of information on engineering materials, tests and test equipment. It also applies to reporting and documenting materials test and design data according to procedures.

Activities may be performed as a member of a design and development team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23109A	Apply engineering mechanic principles

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Identify classes and types of materials and test equipment relevant to mechatronic engineering applications	1.1	Relate material properties to common mechatronic-related methods and processes
		1.2	Identify common characteristics, faults or flaws in materials, components and product in particular engineering applications
		1.3	Identify engineering-related test methods for materials and components or product properties
		1.4	Identify specific industrial test standards/codes, calibration requirements, regulations and authorities related to selection of materials and products for mechatronic engineering applications
2	Identify and use sources of information on engineering materials, materials tests and test equipment	2.1	Review design information for material specifications and required material tests
		2.2	Identify and use appropriate sources of information on materials, materials tests and test calibration
		2.3	Identify and use appropriate sources of information on methods of testing of properties of materials
		2.4	Investigate and report on the use of relevant standards and codes
		2.5	Identify and use appropriate sources of information on material safety data sheets (MSDS)
3	Specify and implement methods used to test or obtain the properties of	3.1	Specify required materials tests and manage implementation of tests to ensure quality, safety and suitability for applications
		3.2	Ensure traceability of measurement standard

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	engineering materials	3.3	Obtain test sheets or certificates for appropriate materials for applications in accordance with organisational procedures and/or codes and regulations
		3.4	Obtain appropriate MSDS for applications in accordance with organisational procedures and/or codes and regulations
4	Select and implement materials and components for mechatronic engineering applications	4.1	Select materials for use in given mechatronic engineering applications based on relevant test information
		4.2	Incorporate materials and components into mechatronic processes in accordance with design functional requirements
5	Report on and record materials design data and methods and results of materials tests	5.1	Report and record materials selections against design functional requirements in accordance with organisational procedures, codes and regulations
		5.2	Include environmental impact and sustainability assessment
		5.3	Report and record materials tests and test sheets/certificates in accordance with organisational procedures, codes and regulations, including appropriate calibration and traceability
		5.4	Report and record appropriate MSDS for applications in accordance with organisational procedures, codes and regulations

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- selecting class of materials suitable for mechatronic applications based on comparison of material properties

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- identifying for common characteristics, faults or flaws in materials
- identifying test methods for properties of, and faults and flaws in, materials and components
- identifying specific industrial test standards and regulations for materials and particular engineering applications
- selecting the most appropriate tests from a range of possible tests
- identifying and applying standards and regulations for materials and components
- sourcing and using materials test sheets and certificates
- sourcing and implementing MSDS
- implementing tests correctly for materials and component properties and faults
- interpreting design documentation for materials and materials testing requirements
- addressing environmental and sustainability requirements related to material selection
- reporting, recording and filing test reports and documentation
- implementing materials tests and test sheets/certificates, test calibration and traceability

Required knowledge

Required knowledge includes:

- properties of materials classes
- the effect of material properties, faults and flaws on mechatronic engineering methods and processes
- test methods and procedures for materials and components, including specific industrial test standards, regulations and authorities related to particular engineering applications
- sources and uses of information on materials and materials tests, including test certificates, regulations, standards, regulatory bodies and industrial authorities
- methods of accessing MSDS
- significance of test sheets/certificates to applications
- significance of MSDS and relevance of procedures
- materials selections in relation to design functional requirements
- environmental impact and sustainability assessment
- significance of test procedures, reports and documentation to applications, including the need for obtaining and filing test sheets and certificates
- significance of test calibration and traceability

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to select and test mechatronic engineering

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	materials.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • review mechatronic design information for materials and materials test requirements • select classes of materials relevant to design for further research, testing and evaluation • identify mechatronic engineering-related standards, codes and regulatory requirements relevant to materials testing and application • specify appropriate tests and interpret test results for material selection • select materials consistent with test results and design and regulatory requirements • ensure traceability in material selection process • correctly document all results and tests.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. • This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with selecting and testing mechatronic engineering materials or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of

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	process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Classes and types of materials	Classes and types of materials include: • non-ferrous metals and alloys • ferrous metals • non-metals (e.g. timber, concrete, ceramics, polymers and fabrics, adhesives, fibres and lubricants) • thermal and electrical conductors and insulators • semiconductors • substrates • cables and cable supports • fluids and lubricants
Properties and characteristics of materials	• Properties and characteristics of materials may include: • physical properties (e.g. strength, elasticity, plasticity, malleability, hardness, toughness, brittleness, fatigue endurance, mouldability, weldability, machinability, formability, resistance to creep and stress relaxation, resistance to degradation – use of plastic fillers to enhance UV resistance – and adhesion) • electrical related properties (e.g. resistivity, conductivity, electro-magnetic, i.e. permeability, permittivity and electro-static susceptibility)

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	• thermal, chemical and optical • material structure and effect on properties • susceptibility to corrosion • effects of manufacturing and construction processes on material properties
Mechatronic engineering	Mechatronics is usually defined as the integration of mechanical, electronics, programming, electrical and fluid power in an engineering product. The skills and underpinning knowledge of mechatronics are common with general automation of processes, systems and services. The definition of mechatronics is here broadened to include general automation.
Sources of information	Sources of information may include: • standards and codes • MSDS • reference texts • manufacturer catalogues and other published information • regulatory bodies • technical, professional and industrial associations and societies
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to the mechatronic engineering analysis task
Tests of materials	Tests of materials include: • destructive, including tensile, compression, impact, hardness, fatigue, corrosion, stress relaxation and creep, fatigue and peel resistance (adhesives) • non-destructive, including hardness, ultrasonics, X-ray, die penetrant, eddy current, surface friction, conductivity, heat expansion, photo-elastic, heat capacity refractive index and magnetic hysteresis loop • electrical-related testing (e.g. conductivity, insulation, earthing resistance and safety)
Traceability	Test calibrations can be traced back to the relevant base unit in the relevant measurement system

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Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23109A Apply engineering mechanics principles

Modification History

Release 1 (MEM05v9).

Unit Descriptor

This unit of competency covers the application of mechanics and strength of materials principles to devices, machines and systems and their components in order to identify key mechanical properties. It includes a range of basic analyses of static and dynamic loads and moments, stresses and deflections, velocities and accelerations.

Application of the Unit

This unit applies to analysis of mechanical devices, machines and systems and their components to determine a range of mechanical related properties. It covers the analysis of 2-D forces and moments, stresses and deflections on bodies, frames and beams. It is suitable for people working as technicians in engineering or related fields using basic mechanics principles and those pursuing careers and qualifications in engineering or related disciplines.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

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Elements and Performance Criteria

1	Identify scope of required analysis	1.1	Identify device, machine or system and component parts for analysis
		1.2	Assess engineering mechanics principles, skills and techniques required by tasks
		1.3	Review functions and features of devices, machines and systems
		1.4	Assess software techniques required for basic analysis and graphics required by the task
		1.5	Identify stakeholders to be consulted on analysis tasks
		1.6	Confirm work health and safety (WHS) and regulatory requirements, risk management and organisational procedures
		1.7	Review sustainability implications of tasks
		1.8	Determine available sources for any required technical and professional assistance
2	Apply engineering mechanics principles and techniques to tasks	2.1	Identify appropriate engineering mechanics principles and analytical, graphical and software-assisted techniques applicable to task
		2.2	Validate software results using analytical and graphical methods
		2.3	Ensure clear and logical process of analysis and compatibility of units in calculations
		2.4	Apply resultant loads and reactions on machines, support frames and beams due to parallel and oblique, concentrated and distributed loads and moments
		2.5	Apply the torque and power required to drive translation screws and winding drums against inclined and vertically suspended loads subject to gravitation, acceleration and friction resistance loads

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		2.6	Select a range of standard hardware to meet specifications
		2.7	Analyse bending and shear stresses in beams subject to static point and distributed loads
3	Report results	3.1	Record results of investigation, evaluation and application
		3.2	Provide documentation, such as calculations, diagrams, programs and files

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying parameters and context of tasks, chain of responsibility, WHS and regulatory requirements, risk management and organisational procedures
- confirming personal functions and responsibilities, team and support functional group interdependencies and communications, appropriate qualifications and delegations, and appropriate support
- reviewing sustainability implications, functions and features of devices, machines and systems
- assessing and applying mechanics principles, software basic analysis and graphics skills and techniques to mechanical devices and systems
- employing techniques to ensure clear and logical process of analysis and compatibility of units in calculations
- reporting and documenting results of investigation, evaluation and application, calculations, diagrams, programs and files

Required knowledge

Required knowledge includes:

- mathematical techniques, including arithmetic, algebra, trigonometry, geometry and differential calculus
- definition of typical applications of mechanics, statics, dynamics, kinematics, kinetics and strength of materials
- analytical, graphical, semi-graphical and software-assisted techniques for all tasks

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- physical quantities and dimensions, including international system of units (SI) and fundamental dimensions and units
- basic principles of statics applicable to mechanical devices and systems
- application of force systems applied to bodies, frames and beams
- friction laws and applications in mechanical devices and systems
- stress and strain:
  - axial stress
  - shear stress
  - bolted and welded joints
  - torsional stress
- bending of beams
- dynamics applicable to mechanical devices and systems, including:
  - kinematics of rectilinear motion:
    - displacement, velocity and acceleration
    - equations of rectilinear motion
    - equations of simple harmonic motion
    - uniform acceleration and sinusoidal acceleration
  - kinetics of rectilinear motion:
    - force, mass and acceleration
    - freely falling bodies
    - acceleration against resistance (accelerating force = unbalanced force)
    - acceleration against gravity and terminal velocity
    - acceleration against dry sliding friction and air resistance
    - forces diagrams
  - curvilinear motion:
    - normal acceleration in curvilinear motion
    - centrifugal force
    - circular motion as a particular case of curvilinear motion
  - kinematics of rotation:
    - rotational motion
    - angular displacement
    - angular velocity
    - angular acceleration
    - conversions of units of angular motion
    - equations of rotation with uniform acceleration
    - relation between linear and angular motion
  - kinetics of rotation:
    - moment of inertia, second moment of mass, concept and units
    - torque due to inertia compared with torque due to winding drum rope force
- the law of a machine

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- work, energy and power
- specifications for engineering hardware applicable to mechanical devices and systems

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to apply principles of mechanics to machines, support frames, beams and related components to determine static and dynamic loads, stresses and deformations to contribute to the design and component selection process. This includes working individually and as part of a team and recognising and complying with normal control procedures on engineering projects.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • determine parameters and context of tasks • apply WHS, regulatory requirements, risk management and organisational procedures • confirm personal functions and responsibilities • review sustainability implications, functions and features of devices, machines and systems • assess and apply engineering mechanics principles, including use of software basic analysis and graphics skills and techniques • ensure compatibility of units in calculations • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be

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	made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Engineering mechanics tasks	Engineering mechanics tasks covered by this unit include, but are not limited to: • application of resultant loads and reactions on machines, support

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	frames and beams • application of the torque and power required to drive translation screws and winding drums against inclined and vertically suspended loads subject to gravitation, acceleration and friction resistance loads • selecting a range of standard hardware, such as shafts, bolts and hooks, subject to plane axial or shear stresses and deformation limits • analysing bending and shear stresses in beams subject to static point and distributed loads
Motion	Motions described in this unit may be of constant velocity, constant acceleration or sinusoidal accelerations (e.g. sprung bodies). Other non-uniformly accelerated motions may be described for contrast only. This unit confines itself to 2-D plane motion

Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies may include:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements

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Analysis	Analysis may include: • static and dynamic analysis of loads • the stresses and deformations resulting • the transmitted power, torque and speed • graphical and mathematical methods and software options

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23111A Select electrical equipment and components for engineering applications

Modification History

Release 1 - New unit. Replaces MEM23051A, but not equivalent.

Unit Descriptor

This unit of competency covers the identification and matching of electrical supply and electrical system equipment and components to mechanical, manufacturing and mechatronic engineering applications. It includes electrical principles and laws, inductive and capacitive effects on AC supplies, control system power supply fundamentals, electrical safety and earthing systems, electrical motors and motor controls.

Application of the Unit

This unit applies to people working as technicians in engineering or related fields where electrical power supply, equipment and systems must be considered. The unit applies to mechanical, manufacturing and mechatronic engineering applications which include electrical equipment, including domestic, commercial or industrial situations. Electrical equipment and component identification covered by this unit is from manufacturer catalogues or other standard specifications. The unit does not cover one-off design or modification to electrical equipment.

The unit does not cover the undertaking of licensed electrical work but will often apply to individuals working as part of a team that includes licensed electricians.

This unit includes knowledge of electrical dangers and safety procedures and the need to comply with work health and safety (WHS) and electrical regulatory requirements.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Investigate context of electrical equipment and supply	1.1	Review functions and features of devices
		1.2	Identify safe machine
		1.3	Identify WHS and regulatory requirements
		1.4	Determine available sources for any required licensed electrical
		1.5	Review sustainability implications of energy source options
2	Determine electrical supply, equipment and components required for engineering-related tasks	2.1	Assess electrical supply specifications for engineering application
		2.2	Analyse electrical motors and their control options for suitability
		2.3	Estimate power factor requirements for engineering applications
		2.4	Examine engineering application control and communication requirements
		2.5	Appraise isolation, shutdown and emergency equipment options
		2.6	Analyse maintenance, life cycle and sustainability requirements of electrical systems and equipment options

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		2.7	Apply specification, documentation and graphical techniques, modelling, mock-up or prototyping techniques, where required, to achieve or test options
		2.8	Identify preferred electrical supply system, equipment and components
3	Report results	3.1	Record results of investigation, evaluation and application
		3.2	Provide documentation, such as calculations, diagrams, programs and files

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- evaluating relevance of WHS, regulatory requirements, standards and codes of practice
- evaluating multiple solutions against design criteria, risk, sustainability and cost factors
- applying life cycle design and sustainability parameters to identification of task
- solving problems and making decisions with systems thinking approach for contingencies and constraints and continuous improvement
- reviewing sustainability implications, functions and features of devices, machines and systems employing electricity and electrical principles
- integrating electrical evaluation techniques with overall engineering application requirements, including mechanical; fluid power; electronic; heating, ventilation, air conditioning and refrigeration (HVAC/R); and controller and networking
- assessing and applying basic electrical principles and techniques, software basic analysis and graphics skills and techniques to engineering tasks
- ensuring safe electrical working practice
- ensuring compatibility of units in calculations
- reporting and documenting results of investigation, evaluation and application, calculations, diagrams, programs and files

Required knowledge

Required knowledge includes:

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- energy source options, sustainability implications of electricity generation, distribution and use
- sustainable sources of energy
- features and function of electrical systems in a range of engineering applications, such as:
  - sources and reliability of supply (e.g. mains, generators and batteries)
  - fault and other protection requirements
  - electrical system control and interfacing with other systems
  - maintainability
  - efficiency
  - fitness for purpose
- WHS and regulatory requirements with particular emphasis on automation safety, codes of practice, standards, risk management and registration requirements
- the effects of electricity on humans, including dangerous high currents and voltages related to extra low, low and high voltage applications and relating these to engineering applications
- licensed technical and professional assistance
- electrical laws and theorems
- electrical circuit components
- AC and DC electrical supply systems:
  - single and 3-phase power
  - power factor
  - distribution systems, including transformers, cables and switchboards
  - local area distribution considerations and supply authority requirements
  - typical and possible faults and dangerous situations
  - earthing systems, such as multiple earth neutral (MEN) system
- circuit protection devices, such as fuses, thermal relays, circuit breakers and residual current devices
- basic electrical circuits and applications for lighting, motors, controllers, heaters and coolers
- graphical symbols and diagramatic representation of basic circuits and power supply fundamentals
- electrical power consumption
- electrical measurements and techniques

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must

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	be able to apply electrical principles to ensure safe practice, assist with systems development, component selection and maintenance and broadly evaluate electrical features, functions and performance of machines or systems. This includes working individually and as part of a team and recognising and complying with normal control procedures on engineering projects.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • identify effects and dangers of electricity • review sustainability implications, functions and features of electrical devices, machines and systems • assess and apply basic electrical principles and techniques • evaluate of suitability of electric power supply for applications • apply appropriate calculations and methods for electric motor control • ensure safe electrical working practice and compatibility of units in calculations • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application

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	of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Electrically powered equipment and systems	Electrically powered equipment and systems in mechanical, manufacturing and mechatronic engineering applications may include: • motors • electrical supply equipment, including transformers, switchboards, and power circuit components • sensors, programmable logic controllers (PLCs) and control circuits • isolation, shutdown and emergency cut-offs • lighting • heating, cooling and ventilation • average and maximum load, power factor, switch board layout, earthing and protection systems and power consumption and cost
• **Electrical-related engineering tasks**	Electrical-related engineering tasks covered by this unit include, but

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	are not limited to: • determining WHS, regulatory and risk management requirements • evaluating electrical supply options • technical evaluation of options for electrical equipment and components against peformance, cost and reliability requirements • determining methods for start, stop, speed control and reversing of a range of electric motors • matching of electrical equipment to other systems
Automation safety	Automation safetyrefers to the reliance on emergency stop, failsafe design, redundancy, interlocks and data integrity. Standards apply to general plant design and use as well as the 'functional safety of safety-related electrical, electronic and programmable electronic control systems'

Appropriate licensed technical and professional assistance	Appropriate technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements applying to electrical work

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Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular mechatronic analysis task
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain
Life cycle assessment	Life cycle analysis can be used to improve sustainability of products and services. It may be applied to: • all aspects of manufacture of a single product • the entire operations of an organisation • a particular aspect of operations, such as environmental implications
Sustainability implications	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer

Unit Sector(s)

Competency field

Unit sector Engineering science

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Custom Content Section

Not applicable.

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MEM23112A Investigate electrical and electronic controllers in engineering applications

Modification History

Release 1 - New unit. Replaces MEM23051A, but not equivalent.

Unit Descriptor

This unit of competency covers investigation of new or existing controllers for suitability in automated systems used in engineering applications. The unit includes the application of fundamental controller programming techniques and control system power supply requirements, basic programmable logic controller (PLC), microcontroller and system control and data acquisition (SCADA) applications.

Application of the Unit

The unit applies to controllers used in automated systems in industry. Typical applications of the unit include assessing the ongoing suitability of existing controllers, programming of PLCs, adjustments to controllers for new equipment or products, and condition monitoring.

It is suitable for people working as automation or mechatronics technicians and for people using the services of electrical and control systems technicians. It is suitable for those pursuing careers and qualifications in mechatronic or automated system design and maintenance.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23111A	Select electrical equipment and components for engineering applications

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Determine scope of electro and controller operation	1.1	Assess current or proposed controller context for electrical and automation safety and risks
		1.2	Identify potential or actual dangerous high currents and voltages and check for regulatory compliance requirements related to extra low, low and high voltage applications
		1.3	Identify work health and safety (WHS) and regulatory requirements with particular emphasis on automation safety, codes of practice, standards, risk management and organisational procedures
		1.4	Identify stakeholders to be consulted on investigation task
		1.5	Investigate software and software techniques required for basic analysis and graphics required for controller investigation task
		1.6	Ensure appropriate support, including licensed electrical, technical and professional assistance is available
2	Review functions and features needed in controller application	2.1	Use analytical and graphical software, as required, to review controller application and function
		2.2	Validate software results
		2.3	Undertake instrument readings, as required

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3	Program controllers and SCADA applications for required functions	3.1	Program controller as required for required sequencing and actuations for applications
		3.2	Develop simple SCADA applications for required interactions with inputs and outputs of controllers
4	Report results	4.1	Record outcomes of investigation, evaluation and application
		4.2	Provide documentation, such as calculations, diagrams, programs and files

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying parameters and context of tasks, WHS, regulatory requirements, risk management and organisational procedures
- reviewing effects of electricity on humans, dangerous high currents and voltages and automated systems, regulatory requirements related to extra low, low and high voltage applications, and relating these to electrical and electronic applications in engineering
- reviewing sustainability implications of functions and features of devices, machines, controllers, interfaces, signal conditioning and networks programming and interfacing of PLCs, including sequencing two or more actuations with start, stop and actuation motion confirmation signals
- ensuring safe electrical working practice, including use of licensed personnel
- describeing information flow and control as a flowchart
- reporting and documenting results of investigation, evaluation and application, calculations, diagrams, programs and files

Required knowledge

Required knowledge includes:

- the effects of electricity on humans
- electrical laws:
  - Ohm’s law
  - Kirchhoff’s voltage and current laws

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  - analogies with hydraulics, pressure drop and continuity
- automated systems and mechatronic devices (Note: This unit does not include design or modification of interfacing with these devices)
- common software requirements of control systems, including SCADA, distributed control systems (DCS) and programming
- PLC and microcontroller basic programming functions
- SCADA, including basic editing and programming techniques
- documentation techniques, circuit diagrams, programs and applications
- specifications for hardware applicable to controller techniques in engineering

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to apply controller principles to ensure safe practice, assist with systems development, component selection and maintenance and broadly evaluate electrical, electronic and controller features and functions. This includes working individually and as part of a team and recognising and complying with normal control procedures on engineering projects.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • identify and apply WHS, regulatory and risk management procedures • review dangers and effects of electricity on humans • identify effects and dangers of electricity, automated systems and specialist requirements, such as licensing related to technical work • confirm personal functions and responsibilities and that of team and support functional group • review sustainability implications, functions and features of controllers and related devices, machines and systems • assess and apply basic electrical and electronic control principles, controller programming principles and techniques to simple machine control functions • ensure safe electrical working practice

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	• ensure clear and logical process of analysis • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Controllers	Controllers may be: • PLCs • microcontrollers • DCS • SCADA • other systems and equipment, including proprietary equipment
Controller tasks	Controller tasks covered by this unit include, but are not limited to: • determining WHS, regulatory, risk management and automation safety requirements • programming and interfacing a PLC capable of sequencing two or more actuations with start, stop and actuation motion confirmation signals • developing a simple SCADA application capable of interacting with inputs and outputs of PLCs and/or microcontrollers
Automation safety	Automation safety refers to the reliance on emergency stop, failsafe design, redundancy, interlocks and data integrity

Appropriate licensed trade, technical and professional assistance	Appropriate licensed trade, technical and professional assistance may include:
	• availability of licensed electrical tradespersons for work covered by electrical licensing regulations
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies may include:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory	WHS, regulatory requirements and enterprise procedures may

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requirements and enterprise procedures	include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements applying to electrical work
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular task

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23113A Evaluate hydrodynamic systems and system components

Modification History

Release 1 - New unit. Replaces MEM23081A, but not equivalent.

Unit Descriptor

This unit of competency covers the evaluation of fluid systems and system components. It includes hydrodynamic fundamentals, including properties of fluids and system component materials, evaluation of system component performance related to flow rates, pressures, forces and power of containment, transport and use of fluids, work health and safety (WHS) compliance requirements and risk management procedures.

Application of the Unit

This unit applies to evaluation of fluid systems and components used in hydrodynamic systems. It is suitable for people working as technicians in these industries or system designers, draftspersons and maintainers, and those pursuing careers and qualifications in engineering or related disciplines.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23006A	Apply fluid and thermodynamics principles in engineering

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Establish scope of hydrodynamic system	1.1	Determine fluid systems and system components to be evaluated
		1.2	Identify stakeholders to be consulted on evaluation tasks
		1.3	Confirm that appropriate support, including technical and professional assistance, is available
		1.4	Determine WHS and regulatory requirements, risk management and organisational procedures
		1.5	Investigate sustainability implications of hydrodynamic applications
2	Apply principles and techniques required for evaluation of hydrodynamic system and components	2.1	Review features and functions of hydrodynamic system and components
		2.2	Determine hydrodynamic principles and techniques required to evaluate system and select and optimise components
		2.3	Determine appropriate analysis techniques, software and software validation techniques
3	Evaluate hydrodynamic system and components	3.1	Assess components and system compatibility with fluid properties
		3.2	Assess suitability of pumps and pump performance in hydrodynamic system
		3.3	Assess forces on bends and section changes in piping systems and confirm they are within specification
		3.4	Assess hydrodynamic performance of components, such as fittings, valves and hoses

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		3.5	Assess open channel systems and optimise for required flow rates
		3.6	Evaluate collar and cylindrical bearings subject to boundary, transitional and hydrodynamic lubrication
4	Report results	4.1	Record outcomes of evaluation
		4.2	Provide documentation, such as calculations, component and system layouts, and functional diagrams

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- determining parameters and context of tasks
- identifying WHS and regulatory requirements
- identifying risk management and organisational procedures
- reviewing sustainability implications, features and functions of hydrodynamic systems and components
- identifying hydrodynamic principles and techniques, analysis techniques, software and software validation techniques
- ensuring compatibility of units in calculations
- evaluating components and system compatibility with fluid properties, pumps, turbines, piping forces, hydrodynamic performance of components, open channel systems, collar and cylindrical bearing lubrication
- selecting equipment and instruments for use in evaluation considering properties and compatibility
- reporting and documenting results of scoping, principles and techniques identification, evaluation of applications, calculations, component and system layouts, and functional diagrams

Required knowledge

Required knowledge includes:

- WHS and regulatory requirements, codes of practice, standards, risk management and registration requirements

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- availability of professional and technical assistance for engineering specialisations
- current options and tends in performance analysis software, including underpinning program techniques and software validation techniques
- properties of fluids:
  - fluid types
  - relevant units of measurement
  - chemical properties
- sustainability issues:
  - hydrodynamic energy, generation and consumption
  - environmental effects of manufacturing and use
- fluid statics
- fluid dynamics, including:
  - flow
  - velocity
  - viscosity
  - pressure
  - fluid power
  - hydrodynamic forces
- hydrodynamic system components
- head loss in pipes and fittings
- pumping systems, including components and methods for determining efficiency
- forces developed by flowing fluids
- open channel flow
- oiled bearings

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to evaluate hydrodynamic systems, including evaluation of system performance, selection of components and calculation of fluid force.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • determine parameters and context of evaluation task • determine WHS, regulatory requirements, risk management and organisational procedures

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	• identify features, functions and components of a range of hydrodynamic systems • investigate and review sustainability implications, features and functions of hydrodynamic systems and components • apply correct hydrodynamic principles and techniques for particular hydrodynamic systems • evaluate components and systems to determine safety, efficiency and fitness for purpose • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.

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Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Hydrodynamic systems	Hydrodynamic systems include: • fluid vessels (e.g. static dams, tanks and pools, and vessel in dynamic applications) • pumping systems (e.g. industrial wash, fire prevention and irrigation) • turbines for hydro-electric power generation • components, such as fluid containers, ducts, pipes, valves, pumps, turbines and fluid measuring devices • open channels for liquid transfer
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer

Appropriate licensed technical and professional assistance	Appropriate technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low

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	voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements applying to electrical work
Standards and codes	Standards and codes refers to all relevant Australian and international standards and codes applicable to a particular hydrodynamic system task

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23114A Evaluate thermodynamic systems and components

Modification History

Release 1 - New unit. Replaces MEM23081A, but not equivalent.

Unit Descriptor

This unit of competency covers the evaluation of thermodynamic systems and components, such as heat exchangers, heat engines, refrigeration and air conditioners, and air compressors.

Application of the Unit

This unit applies to the evaluation of thermodynamic systems and components. The evaluation may be undertaken as part of a design or system selection process or to assess system condition, sustainability or efficiency. It is suitable for people working as technicians or system designers and draftspersons, and those pursuing careers and qualifications in engineering or related disciplines.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23006A	Apply fluid and thermodynamics principles in engineering

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

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Elements and Performance Criteria

1	Determine scope of thermodynamic system	1.1	Determine thermodynamic system and system components to be evaluated
		1.2	Determine stakeholders to be consulted on the evaluation
		1.3	Confirm that appropriate support, including technical and professional assistance, is available
		1.4	Determine work health and safety (WHS) and regulatory requirements, risk management and organisational procedures
		1.5	Investigate sustainability implications of thermodynamic applications
2	Identify principles and techniques required for evaluation of thermodynamic system and components	2.1	Review features and functions of thermodynamic system and components
		2.2	Determine thermodynamic principles and techniques required to evaluate system and select and optimise components
		2.3	Determine appropriate analysis techniques, software and software validation techniques
3	Evaluate thermodynamic applications and components	3.1	Assess the performance of heat transfer devices
		3.2	Assess heat engine performance
		3.3	Assess combustion processes
		3.4	Assess steam processes, where present
		3.5	Assess refrigeration and air conditioning processes, where present
		3.6	Assess air compression processes, where present
4	Report results	4.1	Record outcomes of evaluation

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4.2 Provide documentation, such as calculations, component and system layouts, and functional and thermodynamic cycle diagrams

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- determining parameters and context of tasks
- identifying WHS and regulatory requirements
- identifying risk management and organisational procedures
- investigating and reviewing sustainability implications, features and functions of thermodynamic systems and components
- identifying thermodynamic principles and techniques, analysis techniques, software and software validation techniques
- evaluating components, combustion, steam, air compression, refrigeration and air conditioning processes
- system compatibility with fluid properties, pumps, turbines, piping forces and thermodynamic performance of components
- selecting equipment and instruments for use in evaluation considering properties and compatibility
- reporting and documenting results of scoping, principles and techniques identification, evaluation of applications, calculations, component and system layouts, and functional diagrams and thermodynamic cycle diagrams

Required knowledge

Required knowledge includes:

- WHS and regulatory requirements, codes of practice, standards and risk management requirements
- availability of professional and technical assistance
- current options and trends in performance analysis software, including underpinning program techniques and software validation techniques
- descriptions of thermodynamic devices and systems, such as boilers, turbines, refrigerators, gas-turbines and rockets
- concepts related to thermodynamics, such as:
  - properties, process and state

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  - mass, conservation of mass, specific volume and density, force, weight, pressure and temperature
  - systems, cycles and steady state
- energy forms
- effects of heating of solids and liquids
- heat transfer, conduction, convection and radiation, including related laws and calculations
- typical thermodynamic devices and engines, and thermal cycles
- closed and open systems:
  - non-flow, internal energy
  - flow systems, mass and volumetric flow and continuity of flow
- steady flow and enthalpy, turbines, compressors, boilers and heat exchanger applications
- zeroth and first laws in detail and second law (conceptual)
- gas laws and characteristics
- gas compression effects, measurements and calculations
- compressor types and characteristics heat engines, including types, cycles, performance and efficiency fuels and combustion steam plant and processes for steam generation, heat transfer and power production, including:
  - steam saturation steam tables
- air conditioning, refrigeration and heat pumping plant and processes

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to evaluate thermodynamic systems, including evaluation of system performance and selection of components.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • determine parameters and context of evaluation task • determine WHS, regulatory requirements, risk management and organisational procedures • identify features, functions and components of a range of thermodynamic dynamic systems and components • investigate and review sustainability implications, features and functions of thermodynamic systems and components

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	• evaluate components and systems to determine safety, efficiency and fitness for purpose • evaluate combustion, steam, air compression and refrigeration and air conditioning processes • determine system performance and heat transfer • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer

Appropriate licensed technical and professional assistance	Appropriate technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • ministerial directives

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	• risk assessments • safe work practices • state and territory regulatory requirements applying to electrical work
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular thermodynamic system task

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23115A Evaluate fluid power systems

Modification History

Release 1 - New unit. Replaces MEM23081A, but not equivalent.

Unit Descriptor

This unit of competency covers the evaluation of hydraulic and pneumatic systems and components, including automated fluid power applications characterised by two or three actuators requiring digital control of valves and preset flow and pressure control.

Application of the Unit

This unit applies to the evaluation of manual and automated fluid power systems and components. The evaluation may be undertaken as part of a design or system selection process or to assess system condition, sustainability or efficiency.

It is suitable for people working as fluid power technicians or system designers, draftspersons and maintainers, and those pursuing careers and qualifications in engineering or related disciplines.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23006A	Apply fluid and thermodynamics principles in engineering

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Determine scope of fluid power system evaluation	1.1	Determine fluid power systems and components to be evaluated
		1.2	Identify stakeholders to be consulted on the evaluation
		1.3	Confirm that appropriate support, including technical and professional assistance, is available
		1.4	Determine relevant work health and safety (WHS) and regulatory requirements, risk management and organisational procedures
		1.5	Investigate sustainability implications of fluid power applications
2	Identify principles and techniques required for evaluation of fluid power systems and components	2.1	Review features and functions of pneumatic systems and components for relevance to evaluation
		2.2	Review features and functions of hydraulic systems and components for relevance to evaluation
		2.3	Determine fluid power principles and techniques required to evaluate systems and select and optimise components
		2.4	Determine appropriate analysis techniques, software and software validation techniques
3	Evaluate fluid power systems and components	3.1	Assess fluid suitability, compatibility, and treatment relative to systems
		3.2	Assess features, functions and suitability of hydraulic systems and components for applications
		3.3	Assess features, functions and suitability of pneumatic

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			components for applications
		3.4	Assess suitability of fluid power system and components in automated power applications using two or three actuator hydraulic or pneumatic circuits with digital fluid and electrical/electronic control elements
4	Report results	4.1	Record outcomes of evaluation
		4.2	Provide documentation, such as calculations, component and system layouts, and functional diagrams and fluid power process, and control signal diagrams

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- determining parameters and context of fluid power systems
- identifying WHS and regulatory requirements
- identifying risk management and organisational procedures
- investigating and reviewing sustainability implications, features and functions of fluid power systems and components
- identifying fluid power principles and techniques, analysis techniques, including use of software and software validation techniques
- evaluating fluid suitability, compatibility and treatment, features and functions of hydraulic and pneumatic components and systems both automated and non-automated, digital fluid and electrical/electronic control elements
- reporting and documenting results of scoping, principles and techniques identification, evaluation of applications, calculations, component and system layouts, functional diagrams and fluid power process and control signal diagrams

Required knowledge

Required knowledge includes:

- WHS and regulatory requirements, codes of practice, standards, risk management requirements
- availability of professional and technical assistance

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- current options and trends in performance analysis software, including underpinning program techniques and software validation techniques
- common applications for pneumatics and hydraulics
- comparative advantages of fluid power over mechanical and electrical power for particular applications
- characteristics and properties of pneumatic and hydraulic fluids and relative compressibility of air and hydraulic fluid
- applications and selection criteria for mineral, synthetic and fire-resistant fluids and compatibility of fluids with system materials
- fluid power fundamental principles and calculations for system components, including:
  - conservation of energy
  - energy measurement and units
  - energy forms
  - hydraulics fundamentals, such as pressure, temperature and flow rate relative to actuator force
  - pneumatic fundamentals, such as gas laws, pressure difference and flow rate, and flow to atmosphere
- features and functions and selection criteria of fluid power components in applications, including:
  - pumps
  - valves electrical circuits and control elements actuators
  - accumulators
  - compressors (pneumatics)
  - reservoirs
  - gauges and instrumentation
  - hoses, pipes, filters and fittings
- types and requirements for fluid and electrical circuits maintenance requirements for fluid power systems
- methods of circuit presentation, standard symbols, circuit sequence and signal condition diagrams for multi-actuator circuits

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to evaluate fluid power systems both automatic and non-automated for safety, economy and fitness for purpose, including selection of components.

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Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • determine parameters and context of evaluation task • determine WHS and regulatory requirements, risk management and organisational procedures • investigate and review sustainability implications, features and functions of fluid power systems and components • identify fluid power principles and techniques analysis techniques, software and software validation techniques • evaluate fluid suitability, compatibility and treatment, features and functions of hydraulic and pneumatic components and systems, digital fluid and electrical/electronic control elements • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of

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	process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Hydraulic applications	Hydraulic applications may include: • mobile vehicles and plant • equipment for moving and positioning heavy loads • industrial machinery (e.g. presses for punching, drawing and forging) • industrial and mobile braking systems
Pneumatic applications	Pneumatic applications may include: • transfer mechanisms for moving and positioning light loads • medium load clamping and stamping operations • compressed air distributed systems
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer

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Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular fluid power system task

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23116A Evaluate programmable logic controller and related control system component applications

Modification History

Release 1 - New unit. Replaces MEM23082A, but not equivalent.

Unit Descriptor

This unit of competency covers the evaluation of automated devices, machines and processes controlled by programable logic controllers (PLCs). It includes basic PLC architecture, associated control system components and programming techniques, work health and safety (WHS) compliance requirements, risk management, automation safety, networking for data sharing and remote control, and broad implications of wiring rules.

Application of the Unit

This unit applies to evaluations of PLCs and their use in engineering applications. The evaluation may be undertaken as part of a PLC selection process or to assess PLC and control system condition or efficiency. It is suitable for people working as automation, mechatronics or maintenance technicians or for those pursuing qualifications or careers in those disciplines.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A Apply technical mathematics

MEM23111A Select electrical equipment and components for engineering applications

MEM23112A Investigate electrical and electronic controllers in engineering applications

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Determine scope of evaluation	1.1	Confirm and apply safe electrical working practice
		1.2	Review the currents and voltages present in the PLC applications and check for regulatory requirements and dangerous high currents and voltages, including effects on humans and on application equipment and components
		1.3	Identify WHS and regulatory requirements with particular emphasis on automation safety, codes of practice, standards, risk management and organisational procedures
		1.4	Determine requirement for PLC and related control sytem components
		1.5	Ensure appropriate support, including licensed electrical, technical and professional assistance, is available.
		1.6	Determine software and software techniques for analysis and graphics required by the evaluation task
		1.7	Identify stakeholders to be consulted on evaluation
		1.8	Investigate sustainability implications of PLC applications
2	Establish existing features of PLC applications	2.1	Review the functions and features of devices, machines and processes controlled by PLCs
		2.2	Identify features and functions of PLC systems and components
		2.3	Review PLC programming and functions
		2.4	Identify system integrating principles and techniques, signal conditioning and power interfacing

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		2.5	Identify networking and system supervision, data acquisition and systems control options
3	Evaluate PLC applications	3.1	Determine suitability of components of application including sensor/transducers, PLC and output devices, signal conditioning and interfacing
		3.2	Establish suitablity of controller functions, PLC software and programming
		3.3	Determine suitability of network, system control and data acquisition (SCADA) communications protocols, standards and network topologies, human-machine interfaces (HMIs) and graphical user interfaces (GUIs) used by applications
		3.4	Evaluate compliance of application with WHS and regulatory requirements, codes of practice, standards and risk management procedures
4	Report results	4.1	Record results of evaluation
		4.2	Provide documentation, such as layouts, programs, flow charts, state diagrams and files

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying features and functions of PLCs and control systems, including:
  - components
  - signal conditioning and power interfacing
  - networking and system supervision, data acquisition and systems control options
- ensuring safe electrical working practice, including use of licensed personnel, where required
- investigating sustainability implications of PLC applications
- evaluating safety, condition, efficiency and functionality of PLCs and associated applications, including:

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  - controller functions and programming
  - network and interfacing, including SCADA, communications protocols, standards and network topologies
  - suitability of HMIs and GUIs
  - compliance with WHS and regulatory requirements
- applying WHS, regulatory and automation safety requirements, risk management and organisational procedures
- reporting and documenting results of evaluation, including layouts, programs, flow charts or state diagrams and files

Required knowledge

Required knowledge includes:

- features of a range of PLC and related control system component applications used in engineering environments
- effects of electricity on humans, dangerous high currents and voltages and automated systems, regulatory requirements related to extra low, low and high voltage applications
- relevant compliance requirements of WHS, regulations, codes of practice, standards, and risk assessment requirements for integrated manufacturing systems with particular emphasis on automation safety
- hardware functions, options and integration into PLC and related control systems
- input devices/sensors
- output devices/actuators
- PLCs
- interfacing and signal conditioning
- communications and networking options for devices
- HMIs and GUIs
- PLC architecture
- Input/Output (I/O) functions and arrangements
- typical input signals and sensor/transducers
- shielding and twisted pairing for noise mitigation
- calibration techniques
- reading of discrete levels from analog input data (other analog I/O functions not required by this unit)
- input signal conditioning
- digitally driven output devices and interface requirements power supply
- programming techniques and options

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

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performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to evaluate PLCs and related control system component applications for safety, efficiency and function.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • identify and assess compliance with WHS and regulatory requirements, and risk management procedures • review dangers and effects of electricity on humans • identify PLC related systems and components, integrating principles and techniques • assess suitability of programming • investigate sustainability implications of PLC applications • assess and apply basic electrical and electronic, control principles, controller programming principles and techniques, software basic analysis and graphics skills and techniques • evaluate components of applications against application specifications for safety, economy and fitness for purpose • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package.

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	• Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

PLC applications	PLC applications may include: • industrial (e.g. motor controllers, fault detectors and power controllers) • multi-axis machine control • process automation • packaging, shrink-wrapping, labelling and palletising • utilities, water treatment and effluent treatment • industrial distributed control system • amusement rides • agricultural machine and irrigation controllers • military and aerospace automation (except aircraft systems) • mineral and chemical, and petroleum processing

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PLC software	PLC software and programming language may cover: • ladder diagram (LD) – graphical • function block diagram (FBD) – graphical • structured text (ST) – textual • instruction list (IL) – textual • sequential function chart (SFC) – elements to organise programs for sequential and parallel control processing PLC programming language standards may comply with IEC 61131-3 or other standards

Appropriate technical and professional assistance	Appropriate technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies may include:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular PLC related task
Automation safety	Automation safety refers to the reliance on emergency stop, failsafe design, redundancy, system interlocks and data integrity. Standards apply to general plant design and use as well as the 'functional safety of safety-related electrical, electronic and

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	programmable electronic control systems’
Data and communications protocols and standards	Data and communications protocols and current standards may include: • layered communications and networking protocols, such as Open Systems Interconnection Model (OSI Model) – 7 layers • TCP/IP Internet Protocol Suite {Transmission Control Protocol (TCP) and the Internet Protocol (IP)} – 4 or 5 layers • IEEE 802 Wireless PAN, LAN, MAN and WPAN standards • interface standards, such as RS232 and RS485, Fieldbus, Modbus and DNP3.0
Network topologies	Network topologies may include: • daisy-chain, star, ring, branch, linear and tree • wired and wireless options
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23117A Evaluate microcontroller applications

Modification History

Release 1 - New unit. Replaces MEM23082A, but not equivalent.

Unit Descriptor

This unit of competency covers the evaluation of automated devices, machines and processes controlled by microprocessors. This includes integration of input devices/sensors, output devices/actuators, controllers, interfacing and signal conditioning, human-machine interfaces (HMIs), networking options, data and communications protocols software, and programming of microcontrollers and automation safety. Analog interfacing is included but not proportional integral derivative (PID) interfacing.

Application of the Unit

This unit applies to the evaluation of microcontrollers and their use in automated devices, machines and engineering processes. It is suitable for people working as automation, mechatronics or maintenance technicians or for those pursuing qualifications or careers in those disciplines.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23111A	Select electrical equipment and components for engineering applications
MEM23112A	Investigate electrical and electronic controllers in engineering applications

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Determine scope of evaluation	1.1	Confirm and apply safe electrical working practice
		1.2	Review the currents and voltages present in the microcontroller applications and check for regulatory requirements and dangerous high currents and voltages, including effects on humans and on application equipment and components
		1.3	Identify work health and safety (WHS) and regulatory requirements with particular emphasis on automation safety, codes of practice, standards, risk management and organisational procedures
		1.4	Identify software techniques and graphics required for evaluation
		1.5	Identify stakeholders to be consulted on evaluation tasks
		1.6	Identify sources of technical and professional assistance
		1.7	Investigate sustainability implications of microcontroller applications
2	Establish existing features of microprocessor applications	2.1	Review the functions and features of devices, machines and processes controlled by microprocessors
		2.2	Identify features and functions of microprocessor devices and components
		2.3	Review microprocessor programming and functions
		2.4	Identify system integrating principles and techniques, signal conditioning and power interfacing

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		2.5	Identify networking and system supervision, data acquisition and systems control options
3	Evaluate microcontroller applications	3.1	Determine suitability of components of application, including sensor/transducers, microcontroller and output devices, signal conditioning and interfacing used by applications
		3.2	Assess scope and suitability of microcontroller functions, software and programming to applications
		3.3	Assess suitability of network, system control and data acquisition (SCADA) options, communications protocols, standards and network topologies, HMIs and graphical user interfaces (GUIs) used by applications
		3.4	Review application for compliance with WHS and regulatory requirements, codes of practice, standards and risk management procedures
4	Report results	4.1	Record results of scoping, principles and techniques identification, and evaluation of applications
		4.2	Provide documentation, such as layouts, programs, flow charts, state diagrams and files

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying features and functions of microcontroller systems, including:
  - components
  - system integrating principles and techniques
  - signal conditioning and power interfacing
  - networking and system supervision, data acquisition and systems control options
- ensuring safe electrical working practice, including use of licensed personnel
- investigating sustainability implications of microcontroller applications

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- evaluating safety, condition, efficiency and functionality of microcontrollers and their applications, including
- components of applications
- controller functions and programming, network, SCADA, communications protocols, standards and network topologies
- HMIs and GUIs
- compliance with WHS and regulatory requirements
- applying WHS, regulatory and automation safety requirements, risk management and organisational procedures
- reporting and documenting results of scoping, principles and techniques identification, and evaluation of applications, layouts, programs and flow charts or state diagrams

Required knowledge

Required knowledge includes:

- features of a range of microcontrollers and related control system component applications used in engineering environments
- compliance requirements of WHS, regulations, codes of practice, standards and risk assessment
- effects of electricity on humans, dangerous high currents and voltages and automated systems, and regulatory requirements related to extra low, low and high voltage applications
- hardware functions, options and integration with microprocessor applications
- input devices/sensors, output devices/actuators, controller, interfacing and signal conditioning, communications, HMIs, GUIs, and networking options for devices
- appropriate use of microprocessor related terminology
- microcontroller features and function, including:
  - volatile and non-volitile memory and data storage
  - one-time programmable and reprogrammable microcontrollers
  - typical microcontroller architecture characteristics
  - central processing unit (CPU) functions
  - interrupt structures
  - Input/Output (I/O) functions
  - timers and clocks
  - logic
  - programming methods and techniques

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to evaluate microprocessor devices, machines and processes for safety, economy and fitness for purpose.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • identify and assess compliance with WHS and regulatory requirements, and risk management procedures • review dangers and effects of electricity on humans • identify microprocessor related systems and components, integrating principles and techniques • assess suitability of programming • investigate sustainability implications of microprocessor related applications • assess and apply basic electrical and electronic, control principles, controller programming principles and techniques, software basic analysis, and graphics skills and techniques • evaluate components of applications against application specifications for safety, economy and fitness for purpose • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application.

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	• Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Microcontroller	Microcontrollers are typically an integrated circuit consisting of a CPU combined with support functions, such as a crystal oscillator, timers, watchdog timer, serial and optional analog I/O. A limited amount of read/write memory on the chip along with program memory in the form of reprogrammable flash or ‘one-time programmable’ ROM
Microcontroller applications	Microcontroller applications are found in most industries. Typical applications include: • motor controllers • fault detectors • power controllers • communications • security systems • machine and process automation • automotive and transport applications • domestic appliances • medical equipment
Standards and codes	Standards, codes and protocols refer to all relevant Australian and international standards, codes and protocols applicable to microprocessor related tasks

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Appropriate technical and professional assistance	Appropriate technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies may include:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Automation safety	Automation safety refers to the reliance on emergency stop, failsafe design, redundancy, system interlocks and data integrity. Standards apply to general plant design and use as well as the functional safety of safety-related electrical, electronic and programmable electronic control systems.
Network topologies	Network topologies include: • daisy-chain, star, ring, branch, linear and tree • wired and wireless options
Software for microcontroller applications	Software for microcontroller applications may include: • integrated development environment software which may include programmer, editor, assembler, compiler, linker, simulator and emulator • HMI software • network software • modem software
Sustainability	Sustainability is used to mean the entire sustainable performance of

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	the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23118A Apply production and service control techniques

Modification History

Release 1 - New unit. Replaces MEM23083A, but not equivalent.

Unit Descriptor

This unit of competency covers the application of techniques for production and service control to maintain efficient and effective supply of product or service delivery to customers and to provide data for improvements to enhance competitiveness. This unit includes monitoring and measurement of quality, costs, quantities and reliability of processes in the value chain, including maintenance activities to ensure customer requirements. It requires the use of statistical process control (SPC), and control charts and the graphical representation of results.

Application of the Unit

This unit applies to individuals who are required to control production and/or service delivery processes to ensure quality and for product manufacture or the provision of services to defined quality and operational requirements. It is suitable for people working as service providers, supervisors or technicians and those pursuing manufacturing, engineering or related technical qualifications and careers.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Establish scope of required production or service control	1.1	Identify products or services required by customers, including quality and delivery requirements
		1.2	Identify current production or service control tasks, key performance indicators (KPIs), and context within organisation strategic objectives and markets
		1.3	Identify software techniques required for production or service control, communications and reporting
		1.4	Identify stakeholders to be consulted on the production or service control tasks
		1.5	Confirm work health and safety (WHS) and regulatory requirements, codes of practice, standards and risk assessment requirements
2	Review current data collection and production or service provision	2.1	Determine measurable parameters of production process or service delivery
		2.2	Determine parameters of product or service that are open to control and establish tolerances or acceptable variation
		2.3	Review process control functions
		2.4	Review production control performance indicators/indices
		2.5	Review the role of probability in sampling and SPC
		2.6	Review process capability and SPC evaluation, control charts and sampling
		2.7	Review features and functions of graphical methods for display of data

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3	Analyse data and apply production control principles to improve product manufacture or service provision	3.1	Obtain or record production or service data or appropriate data samples using a range of manual and automated devices
		3.2	Use software and control chart techniques to generate histograms, Pareto diagrams, flowcharts, tallycharts, scatter plots and/or run charts in accordance with procedures
		3.3	Analyse data for trends and correlations and apply to process improvement, quality control and other support functions according to procedures
		3.4	Determine process capability indices for an appropriate sample of a product or service delivery
		3.5	Establish required performance indicators for production or service operations
		3.6	Take corrective action in accordance with procedures
		3.7	Monitor production or service delivery using control charts to determine compliance of the product or service with specified performance limits
		3.8	Take further corrective action, as required
4	Report results	4.1	Provide required reports
		4.2	Provide documentation, such as data, graphics, capability assessments, control and continuous improvement processes

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying production control task parameters and context within organisation strategic objectives and markets

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- confirming stakeholder and support functional group interdependencies and communications, reporting and information flow
- determining controllable parameters of product or service and acceptable variation
- using manual and automatic methods for measurement, data gathering and analysis
- production of different charts used in production and service control, including:
  - histograms
  - Pareto diagrams
  - flowcharts
  - tallycharts
  - scatter plots
  - run charts
- applying a range of sampling plans to products or measurable aspects of services and justifying the choice of sampling plan
- analysing data for trends and correlations
- setting of KPIs capable of measurement and ongoing monitoring
- determining appropriate corrective actions based on analysis of measurable production or service performance parameters

Required knowledge

Required knowledge includes:

- process capability, including:
  - capable processes definition
  - upper, lower and target specification limits
  - in-control
  - out-of-control, assignable causes and trends
  - corrective action plans, such as Western Electric, Wheeler or Nelson rules
  - capability indices
  - sample estimators
  - confidence intervals for indices and Chi square distribution
- role of production or process control in supporting lean processes, for example:
  - value stream management
  - standardised work
  - demand pull
  - just-in-time (JIT)
  - process levelling
  - cycle time
  - quick changeover
  - preventative maintenance
  - waste minimisation

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  - efficient process layout
- role of production control in quality maintenance:
  - mistake proofing process
  - defect detection, production halt and correction procedures
  - total quality management (TQM), quality assurance (QA) procedures and quality control (QC), and SPC processes
  - role of SPC and process capability
- production control performance indicators/indices
- applications where role of probability in sampling and SPC is important
- SPC, including:
  - data types and frequency distributions
  - population mean and standard deviation
  - sample mean and standard deviation
  - upper and lower specification limits and target
  - upper and lower process control limits and centre line
  - data mean and process control centre line offset
  - 3 sigma σ and 6 sigma σ
  - sigma shift to account for long-term drift of data
- types and functions of control charts
- attributes and varaiables of sampling plans
- features and functions of graphical methods for display of data:
  - Ishikawa ‘Fishbone’ diagrams
  - histograms
  - Pareto analysis diagrams
  - flowcharts
  - tallycharts
  - scatter plots
  - run charts, including control charts
- types of manual and automated data collection and information flow

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to measure and analyse production or service performance data and apply techniques for process control to maintain

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	efficient and effective production or supply or service to customers and to provide data for improvements to enhance competitiveness. This includes working individually and as part of a team in accordance with organisational procedures
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • determine measurable and controllable parameters of product or service, • determine acceptable variation of production or service parameters • use manual and automatic methods for measurement, data gathering and analysis • apply software and control chart techniques for SPC, performance analysis and graphical representations, including generating histograms, Pareto diagrams, flowcharts, tally charts, scatter plots and/or run charts from production or measurable service data • review production and service functions in order to recommend or make process improvements that are based on statistical analyses • identify WHS and regulatory requirements, risk management and related organisational procedures • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge.

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	• Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Production control related tasks	**Production control related tasks** covered by this unit may include: • measuring and recording data either manually or using automated data collection • determining process capability indices for a large sample of a product with a particular dimension normally distributed within upper and lower specification limits • applying a range of sampling plans to products or measurable aspects of services and justify the choice of sampling plan based on the properties required of the plan • applying control charts to a sample from a product or service to determine acceptability of the product or service within set limits (e.g.3σ and 6σ limits) • analysing data for trends and taking corrective action in accordance with procedures • selecting and employing appropriate control charts from c-chart, p-chart and X-bar and R or np control charts • employing a Pareto analysis to determine priority issues for solutions related to a specific problem

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Process control	Process control includes the qualitative and quantitative analysis of the process and production data necessary to ensure customer requirement
Required performance indicators for production or service operations	Required performance indicators for production or service operations will vary according to the nature of the product or service and may include: • design features, such as dimensional and weight specifications and tolerances • production schedules • organisation or customer specified target error rates and waste, including those set under lean systems, such as 6σ • equipment availability indices • mass balancing targets • WHS related indicators (e.g. lost time injury) • takt time compliance
WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Lean principles	Lean principles and techniques use cost, capacity and responsiveness, quality, reliability and waste minimisation as drivers of the process and measures for process improvement.

Unit Sector(s)

Competency field

Unit sector Engineering science

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Custom Content Section

Not applicable.

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MEM23119A Evaluate continuous improvement processes

Modification History

Release 1 - New unit. Replaces MEM23083A, but not equivalent.

Unit Descriptor

This unit of competency covers the evaluation of continuous improvement processes for production, engineering and associated services. It requires the evaluation of improvement processes, and the efficiency and effectiveness of their response to continuous feedback from customers and other sources. It requires consideration of the effect of improvements or change on entire systems.

Application of the Unit

This unit applies to production and engineering activities where continuous improvements, such as those to product, process or service, efficiency or competitiveness, is required. It is suitable for people working as service providers, supervisors or technicians and those pursuing manufacturing, engineering or related technical qualifications and careers.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23118A	Apply production and service control techniques
MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential Performance criteria describe the performance needed

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outcomes of a unit of competency. to demonstrate achievement of the element.

Elements and Performance Criteria

1	Establish scope of continuous improvement evaluation	1.1	Identify industrial and market context for continuous improvement
		1.2	Identify features, functions and measurable parameters of products, processes, systems or services, assets and operations subject to continuous improvement
		1.3	Assess software techniques required for continuous improvement
		1.4	Review sustainability implications of evaluation task
		1.5	Identify stakeholders in continuous improvement processes and appropriate licensed technical and professional assistance to be consulted on the tasks
		1.6	Determine compliance requirements of relevant work health and safety (WHS) and regulatory requirements, codes of practice, standards and risk assessment procedures
2	Prepare for evaluation	2.1	Identify appropriate measurement, data gathering, software and other analysis methods to be used for evaluation
		2.2	Identify performance criteria or indices
		2.3	Identify existing process capability, evaluation, control and run charts and sampling procedures
		2.4	Identify existing qualitative continuous improvement processes
3	Evaluate organisation continuous improvement	3.1	Evaluate manual and automatic methods for measurement of parameters of products or services
		3.2	Evaluate data gathering, analysis and performance indices

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	processes	3.3	Evaluate software techniques for performance analysis and visual display generation
		3.4	Evaluate quantitative and qualitative continuous improvement processes
		3.5	Apply systems thinking, constraint and contingency management, problem solving and decision making to evaluation tasks
		3.6	Evaluate sustainability implications of improvements
4	Report results	4.1	Record results of scoping, identification of principles and techniques and evaluation of continuous improvement techniques
		4.2	Provide documentation, such as reports, data, graphics, flow charts and performance indices

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- determining suitability of measurable parameters of products, processes, systems and services for continuous improvement activities
- undertaking measurement, data gathering and analysis, including identifying trends and improvements
- reviewing performance indices, software for data analysis and visual representations and continuous improvement techniques
- evaluating continuous improvement, systems thinking, constraint and contingency management, and lean systems requirements
- producing and interpreting charts used in production and service control, including:
  - histograms
  - Pareto diagrams
  - flowcharts
  - tallycharts
  - scatter plots
  - run chart

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- evaluating sustainability implications of improvements
- reporting and documenting results of scoping, identification of principles and techniques and evaluation of continuous improvement techniques, data, graphics, flow charts and performance indices

Required knowledge

Required knowledge includes:

- features of products, processes, systems and services subject to improvement processes
- economic, social and sustainability implications of products, processes, systems, services and implications of improvement processes
- continuous improvement drivers and mechanisms, such as:
  - market competitiveness
  - maintenance of a technological edge
  - customer expectations
- WHS requirements, codes of practice, regulatory requirements, and standards problem solving and decision making techniques:
  - brainstorming
  - current and future state mapping
  - seven tools of quality:
    - Ishikawa ‘Fishbone’ diagrams
    - histograms
    - Pareto analysis
    - flowcharts
    - scatter plots
    - run charts
    - control charts
- data, performance metrics, graphics and visual indicators
- software options, such as:
  - budgeting, financial and business planning performance metrics analysers and graphics generators
  - maintenance downtime and cost data generators
  - system control and data acquisition (SCADA), distributed control systems (DCS), enterprise resource planning (ERP) and materials resource planning (MRP) system data generators
  - performance data analysis and graphics generators
- statistical process control (SPC) techniques
- qualitiative improvement techniques

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to evaluate continuous improvement processes for production, engineering and related services. This includes working individually and as part of a team in accordance with organisation procedures.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • determine measurable and controllable parameters of product or service and their suitability in continuous improvement processes • identify WHS, regulatory requirements, risk management and related organisational procedures • evaluate manual and automatic methods for measurement and data gathering, including analysis and performance indices, software analysis and visual display • evaluate qualitative continuous improvement processes • evaluate sustainability implications of improvements • measure and gather data, record and analyse for trends and improvements • evaluate continuous improvement, systems thinking, constraint and contingency management and lean systems requirements • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

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Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Features, functions and measurable parameters of products, processes, systems or services, assets and operations subject to continuous improvement	Features, functions and measurable parameters of products, processes, systems, services and assets subject to continuous improvement may include: • sustainability • software • product manufacturability • process design • process control • equipment and tooling • material and product flow

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	• plant layout and transfer operations • standard operating procedures • maintenance • lean systems • labour and skills distribution • information flow • value chain • sales, marketing and planning • management
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer
WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular thermodynamic system task
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may

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	effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain

Continuous improvement processes	Continuous improvement processes may relate to plant, products, production processes, systems and services, including design, development, implementation or manufacture, commissioning, operation or delivery and maintenance.
	Improvement processes may include techniques, such as:
	• balanced scorecard
	• current and future state mapping
	• measuring performance against benchmarks
	• process improvement, problem solving and decision making
	• data management, generation, recording, analysing, storing and use of software
	• training for improvement systems participation
	• technical training
	• qualitative improvement processes, such as:
	  • toolbox meetings
	  • suggestion schemes
	  • mentoring
	  • changes in work organisation, responsibilities and recruitment

Constraints and contingencies	Constraints and contingencies may be: • financial • organisational, procedural or cultural • physical constraints, such as limits to resources, limits to site access or logistical limitations
Lean principles	Lean manufacturing uses cost, capacity and responsiveness, quality, reliability and waste minimisation as drivers of the process and measures for process improvement. Lean manufacturing is the response of many organisations to local, regional, national and global market competitiveness

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Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23120A Select mechanical machine and equipment components

Modification History

Release 1 - New unit. Replaces MEM23091A, but not equivalent.

Unit Descriptor

This unit of competency covers the technical selection of mechanical machine and equipment components. It includes analysis of the application to determine suitability of components and use of performance analysis software.

Application of the Unit

This unit applies to selecting components of machines or equipment based on mechanical engineering-related technical criteria in order to ensure appropriate performance and compliance with standards. The unit applies to selection tasks based on analyses completed by an individual or the use of technical criteria supplied by professional engineers or equipment suppliers. The use of calculus for technical analysis is not covered by this unit.

The unit is suitable for people working as mechanical detailers or designers and draftspersons and those pursuing careers and qualifications in mechanical engineering or related disciplines.

This unit does not cover selection of electric motors; electrical components; fluid power components, including pumps, control components and support structures; and structural fastening and welding with eccentric loadings. These are covered in other units.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23109A	Apply engineering mechanic principles

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Establish scope of machine components selection task	1.1	Identify stakeholders to be consulted on selection tasks
		1.2	Determine relevant compliance requirements of work health and safety (WHS) and regulatory requirements, codes of practice, standards, and risk assessment requirements for machines and equipment
		1.3	Review features and functions of mechanical machines and components
		1.4	Investigate sustainability implications of component selection task
		1.5	Establish availability of technical and professional assistance
2	Examine technical specifications for component selection	2.1	Confirm performance requirements of particular machines or equipment components
		2.2	Select appropriate analysis techniques using graphs, tables, nomograms or computer-aided solutions, as appropriate
		2.3	Analyse operating conditions of components and determine component selection criteria
		2.4	Review design loads, working stresses, allowable deformations and factor of safety for machine components
		2.5	Determine component arrangement, limits, fits and clearances, assembly, fastening and alignment methods

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3	Select machine components	3.1	Specify arrangement and assembly requirements
		3.2	Advise stakeholders of selection and make any required adjustments
		3.3	Ensure traceability of analysis and component selection
4	Report results	4.1	Record results of scoping, principles and techniques identification and component selection procedures
		4.2	Provide documentation, such as calculations, estimations, specifications, diagrams and drawings

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- applying safe working practices and procedures when working with machines and equipment
- component arrangement, limits, fits and clearances, assembly, fastening and alignment methods
- investigating sustainability implications of machine development, manufacture and use
- reviewing features and functions of machines and components
- identifying design features of machines, equipment and components, including:
  - loads
  - working stresses
  - allowable deformations and factor of safety
  - component arrangements
  - limits and fits
  - assembly, adjustment and fastening methods
- identifying relevant analysis support, such as graphs, tables, nomograms or computer-aided solutions and validation techniques
- selecting and specifying machine and equipment components, arrangement and assembly requirements
- communicating with stakeholders, professionals and technicians
- identifying and complying with relevant WHS and regulatory requirements and risk assessment procedures

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- reporting and documenting results of component selection, including calculations, specifications, diagrams and drawings

Required knowledge

Required knowledge includes:

- WHS and regulatory requirements, codes of practice, standards and risk management requirements relevant to mechanical component selection processes
- current options and trends in performance analysis software, including underpinning program techniques and software validation techniques
- conditions for equilibrium
- reactions at beam supports (e.g. simply supported, overhung and cantilever beam with vertical and oblique concentrated, uniform and variable distributed loads and couples)
- shear force and bending moments, including diagrams
- vertical and oblique concentrated and uniform and variable distributed loads
- bending and shear stresses
- torsion distribution diagrams
- combined stresses
- properties of common machine and component materials
- stress concentration and fatigue due to alternating stresses
- deflection of beams
- bolted and welded connections with central loads (bolted joints may include friction forces)
- static versus dynamic forces, balanced and unbalanced
- dynamics and laws of rotational motion
- work and forms of mechanical energy and power
- dynamic systems
- mechanical power and drive efficiency
- mechanical drives
- block, band and disk brakes and clutches with single contact surface
- mechanical couplings and devices
- dynamic balancing of rotating masses
- stresses in flywheels
- stresses in thin walled pressure vessels

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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Overview of assessment	A person who demonstrates competency in this unit must be able to select a wide variety of mechanical machine and equipment components for safety, economy and fitness for purpose. Selections must be able to be justified through appropriate engineering analysis.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • determine component arrangement, limits, fits and clearances, assembly, fastening and alignment of components • investigate sustainability implications of components selection task • review features and functions of machine and equipment components, design loads, working stresses, allowable deformations and factor of safety • select and specify machine components, including arrangement and assembly requirements • evaluate machine components and arrangements for compliance with WHS and regulatory requirements and risk assessment • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge.

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	• Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Machine and equipment components	Machine and equipment components for this unit are limited to components peforming mechanical functions. Examples include: • shafts • bearings • couplings • power screws • gear drives • spur gears • chain and belt drives • brakes • clutches
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular selection of mechanical machine and equipment components task

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Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

Sustainability implications	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer
Analysis of machine and components	Analysis of machine and equipment components may include: • static and dynamic analysis of loads • the stresses and deformations resulting • the transmitted power, torque and speed • machine/operator interface in terms of ergonomics and safety • environmental effects, including noise, energy efficiency, heat generation and dust generation • graphical and mathematical methods and software options
Appropriate computer-aided solutions and validation techniques	Appropriate computer-aided solutions include: • performance analysis and computer-aided design (CAD) modelling Validation techniques include:

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	• comparison of traditional solutions for simple design problems with software solutions to the same design problems • review of previously implemented design challenges which were completed using the software

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23121A Analyse loads on frames and mechanisms

Modification History

Release 1. Replaces MEM23091A, but not equivalent.

Unit Descriptor

This unit of competency covers the analysis of loads on mechanisms, frames and structural support elements, such as linkages, rods, shafts and beam elements within machines and mechanisms. It includes safe working practices, work health and safety (WHS) compliance requirements, function and features of frames and mechanisms, load and deflection analysis for static and dynamic elements, and traditional and software-based techniques.

Application of the Unit

This unit applies to the analysis of loads on mechanisms, beams, frames and support elements either individually or with the assistance of a professional engineer for more complex calculations of loads and stresses. It is suitable for people working as mechanical detailers or designers and draftspersons, and those pursuing careers and qualifications in mechanical engineering or related disciplines.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23007A	Apply calculus to engineering tasks
MEM23109A	Apply engineering mechanics principles

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Establish scope of frame and mechanism analysis	1.1	Determine compliance requirements of relevant WHS and regulatory requirements, codes of practice, standards and risk assessment and for design and use of machines and equipment
		1.2	Identify features, functions, operating conditions and performance requirements of frames, beams and mechanisms
		1.3	Investigate sustainability implications of frames and mechanisms
		1.4	Review design loads, working stresses, allowable deformations and factor of safety for elements
		1.5	Review element arrangements, assembly and fastening methods
		1.6	Identify any complex load calculations to be done with or obtained from a professional engineer
		1.7	Establish availability of other technical and professional assistance
		1.8	Identify and evaluate appropriate analysis techniques, software and software validation techniques
		1.9	Identify stakeholders to be consulted on selection tasks
2	Analyse loads and performance of frames and mechanisms	2.1	Estimate static and dynamic operating conditions and determine design or selection parameters
		2.2	Optimise frame, beam and mechanism elements for strength, deflection, arrangement and fastening
		2.3	Review analysis with stakeholders and make any required adjustments

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		2.4	Confirm compliance of frames and mechanisms with WHS and regulatory requirements, standards and codes of practice
3	Report results	3.1	Record results of scoping, principles and techniques identification and analysis
		3.2	Provide documentation, such as calculations, specifications diagrams and drawings

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- applying safe working practices and procedures when working with frames, mechanisms and equipment
- evaluating frames, beams and mechanisms for WHS, regulations and risk management requirements
- investigating sustainability implications of frames and mechanisms
- reviewing design features, functions and performance requirements of frames, beams and mechanisms, including:
  - dynamics
  - design loads
  - working stresses
  - allowable deformations and factor of safety element arrangements
  - assembly and fastening methods
- selecting appropriate analysis techniques, software and software validation techniques
- identifying relevant analysis support, such as graphs, tables, nomograms or computer-aided solutions and validation techniques
- analysing static and dynamic operating conditions and determining design or selection parameters
- optimising frame, beam and mechanism elements for strength, deflection, arrangement and fastening
- communicating with stakeholders
- reporting and documenting results of analysis, including calculations, specifications, diagrams and drawings

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Required knowledge

Required knowledge includes:

- WHS and regulatory requirements, codes of practice, and directives and standards, including those related to risk management
- current options and trends in performance analysis software, including underpinning program and software validation techniques
- types and functions of frames and mechanisms
- mechanisms for converting linear to rotary motion and rotary to linear motion
- lifting machines
- design loads, working stresses, allowable deflections and factor of safety for machine elements
- conditions for equilibrium
- non-coplanar and force systems
- equilibrium of non-coplanar and non-concurrent force systems
- reactions at beam supports (e.g. simply supported, overhung and cantilever beam with vertical and oblique concentrated, uniform and variable distributed loads and couples)
- shear force and bending moments
- shear force and bending moment diagrams
- vertical and oblique concentrated and uniform and variable distributed loads
- types and locations of stresses, including:
  - combined stresses
  - thermal stress due to restrained expansion
  - stress concentration and fatigue due to alternating stresses
- centre of gravity
- centre of percussion
- methods of analysis of frames and trusses
- deflection of beams
- statically indeterminate beams
- buckling of compressed members
- loads and stresses on bolted and welded connections
- static versus dynamic forces, balanced and unbalanced
- dynamics and laws of rotational motion
- dynamic analysis of mechanisms
- linked bodies in motion, including types, impulse, momentum and work energy methods
- work, energy and power for balanced and unbalanced force systems

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to analyse loads on a variety of frames and mechanisms to confirm performance and safety compliance.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • identify and review features, functions and performance requirement of frames, beams and mechanisms • identify complex calculations requiring professional engineering assistance • establish dynamics, design loads, working stresses, allowable deformations and factor of safety element arrangements for calculations to be done • evaluate assembly and fastening methods, analysis techniques, software and software validation techniques • analyse static and dynamic operating conditions and determine design or selection parameters • optimise frame, beam and mechanism elements for strength, deflection, arrangement and fastening • communicate and negotiate with stakeholders, professionals and technicians and make adjustments accordingly • evaluate frames, beams and mechanisms for WHS and regulatory requirements, and risk management compliance • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics

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	and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Structural support and machine elements	Typically these are beam, strut and tie elements of machines and machine supports subject to bending, tension, compression and shear stresses, and may include: • shafts, levers, cams and linkages • frames, staunchions and beams

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	• mechanisms for converting linear to rotary motion and rotary to linear motion • mechanisms with up to five linkages • lifting machines
Machine mechanisms	Machine mechanisms refers to a device to produce a constrained motion while producing a required output. A mechanism is an assembly of elements or links which may be called 'kinematic pairs', which remain in contact throughout their motions. One link, typically the base element, is fixed. Kinematic pairs may be described as turning, sliding, rolling or skidding pairs
WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Standards and codes	Standards and codes refer to all relevant Australian and International standards and codes applicable to a particular frame and mechanism
Load calculations to be done with, or obtained from, a professional engineer	The unit requires the ability to identify calculations that should be obtained from or calculated with the assistance of a professional engineer. These may include: • regulatory or organisational requirement for professional engineer involvement • static and dynamic complex analysis of loads, including resulting stresses and deformations • choice of graphical and mathematical methods and software options

Appropriate licensed technical and professional assistance	Appropriate licensed technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low

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	voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer
Appropriate computer-aided solutions and validation techniques	Appropriate computer-aided solutions may include: • software employed for performance analysis/modelling. Underpinning program techniques and algorithms should be understood, such as the use of finite element analysis (FEA) and numerical methods within object oriented modelling techniques Validation techniques include: • comparison of traditional solutions for simple design problems with software solutions to the same design problems • review of previously implemented design challenges which were completed using the software

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23122A Evaluate computer integrated manufacturing systems

Modification History

Release 1 - New unit. Replaces MEM23092A, but not equivalent.

Unit Descriptor

This unit of competency covers the evaluation of computer integrated manufacturing (CIM) systems. It includes hardware, controllers, networks and data handling for business, planning and control, manufacturing operations, automation safety, work health and safety (WHS) and risk management compliance, software and system integration.

Application of the Unit

This unit applies to evaluation of computer integrated systems used in manufacturing. It is suitable for people working as manufacturing technicians or paraprofessionals and draftspersons and those pursuing manufacturing, engineering or related technical qualifications and careers.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23111A	Select electrical equipment and components for engineering applications
MEM23112A	Investigate electrical and electronic controllers in engineering applications

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Determine scope of CIM application	1.1	Identify stakeholders to be consulted on the evaluation
		1.2	Confirm that appropriate support, including technical and professional assistance, is available
		1.3	Identify WHS and regulatory requirements, codes of practice, standards and risk assessment requirements for CIM systems with particular emphasis on automation safety
		1.4	Identify appropriate analysis techniques, software techniques and graphics required for evaluation
		1.5	Identify stakeholders to be consulted on evaluation tasks
		1.6	Investigate sustainability implications of CIM systems
2	Evaluate CIM components and systems	2.1	Evaluate parameters and requirements of manufacturing operations
		2.2	Evaluate machines, processes and data flow for machine and process control in CIM systems
		2.3	Evaluate system control, signal generation and conditioning, controller functions and actuator power interfacing
		2.4	Evaluate data collection, sharing and control software and programming for hardware integration
		2.5	Evaluate the data and communications protocols, standards and network topologies for the applications
		2.6	Evaluate system integration of hardware, controllers, human-machine interfaces (HMIs) and graphical user interfaces (GUIs) and network

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		2.7	Evaluate system analysis and simulation software and validation techniques
		2.8	Evaluate automation safety and compliance with WHS, regulatory requirements, standards and risk management implementation
3	Report results	3.1	Record results of scoping, principles and techniques identification and evaluation of systems
		3.2	Provide documentation, such as layouts, programs, flow charts and files

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required knowledge includes:

- relating manufacturing context and requirements to existing or planned CIM applications and continuous improvement requirements
- identifying WHS, regulatory requirements and risk management compliance
- evaluating CIM systems against automation safety requirements
- investigating sustainability implications of CIM systems
- evaluating features and functions of existing or planned CIM systems against:
  - components
  - processes and data flow
  - controller functions
  - signal and power interfacing
  - communications protocols
  - standards and network topologies
  - HMIs and software
  - automation safety
  - compliance with WHS and regulatory requirements
- applying CIM related software analysis, and software validation techniques
- reporting and documenting results of scoping, principles and techniques identification and evaluation of systems, layouts, programs and flow charts

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Required knowledge

Required knowledge includes:

- types of manufacturing operations, their features and parameters and potential for CIM applications, for example:
  - continuous, mass, batch and jobbing
  - prototype manufacture
  - cellular manufacturing
  - jobbing
  - just-in-time (JIT) and other lean manufacturing systems and techniques
  - maintenance systems and techniques (e.g. condition monitoring)
- compliance requirements of WHS and regulatory requirements, codes of practice, standards, and risk assessment for CIM systems with particular emphasis on automation safety
- sustainability implications of CIM systems
- CIM hardware
- CIM principles and techniques required to evaluate systems and select and optimise components
- current options and trends in performance analysis and programming software, including underpinning program techniques and algorithms
- LAN and WAN network communications in CIM applications
- documentation, drawings, specifications, instructions required, process information and programming
- interdependencies and communications linkages between team members, support functional groups, and licensed technical and professional support

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to evaluate CIM systems for safety, economy and fitness for purpose. This includes working individually and as part of a team in accordance with organisational procedures.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • evaluate compliance with WHS, regulatory requirements and risk management with particular emphasis on automation safety

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	• investigate sustainability implications of CIM systems • review features and functions of CIM systems • identify CIM principles and techniques, analysis, software and software validation techniques • evaluate parameters of manufacturing operations and the features and suitability of CIM components and systems • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for	Assessment processes and techniques must be culturally

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assessment	appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

CIM	CIM uses mechatronic and manufacturing technologies integrated across an enterprise by the communication of data to control plant and operations, plan production, marketing, maintenance and feedback to the business planning process
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to CIM applications and systems
Automation safety	Automation safety refers to the reliance on emergency stop, failsafe design, redundancy, system interlocks and data integrity. Standards apply to general plant design and use as well as the 'functional safety of safety-related electrical, electronic and programmable electronic control systems'

Appropriate technical and professional assistance	Appropriate technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and	WHS, regulatory requirements and enterprise procedures may include:

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enterprise procedures	• WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
CIM hardware	Hardware options for CIM systems may include: • robots • pick and place, materials handling, automated guided vehicles (AGVs) and transfer devices • fluid power components • pumping and wash equipment • boilers, heating and drying equipment • pasteurising, chilling and refrigeration equipment • welding equipment • moulding, casting and forging equipment • pressing, forming, drawing and cropping equipment • surface finishing, plating and painting • packaging equipment • mechanical linkages and support structures • pressure, temperature, proximity sensor/transducers, relative and absolute encoders, vision systems and smart cameras • controllers, programmable logic controllers (PLCs) and remote telemetry units (RTUs) • HMIs (e.g. touch screens) • power interfaces and signal processors for digital and analog control • stepper motors • servo motors, torque, speed and position control • special purpose equipment (e.g. package labelling equipment, logistics and warehousing requirements) • wired and wireless networking systems
Data and communications protocols and standards	Data and communications protocols and standards include the set of standardised rules for data and signal syntax, checking and error detection. Hardware and software generate data in accordance with a protocol that allows generators and receivers to understand or translate the data as information, control signals integrity and error checks. These may include the following or their current updates: • layered communications and networking protocols • Open Systems Interconnection Model (OSI Model) – 7 layers

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	• TCP/IP Internet Protocol Suite {Transmission Control Protocol (TCP) and the Internet Protocol (IP)} – 4 or 5 layers • IEEE 802 LAN/MAN group of standards, including IEEE 802.3 Ethernet standard, IEEE 802.11 Wireless networking standard • Interface standards, such as: RS232 and RS485, Fieldbus, Modbus and DNP3.0
Network topology	Network topology refers to the arrangement of connected hardware. These include: • bus, ring, star, tree, mesh and in-line (2 way comms.) arrangements • wired and wireless options
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant, including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer
Continuous improvement implementation	Continuous improvement implementation may relate to plant, products, processes, systems or services, including design, development, implementation or manufacture, commissioning, operation or delivery and maintenance. Improvement processes may include techniques, such as: • balanced scorecard • current and future state mapping • measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training

Unit Sector(s)

Competency field

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Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23123A Evaluate manufacturing processes

Modification History

Release 1 - New unit. Replaces MEM23093A, but not equivalent.

Unit Descriptor

This unit of competency covers the evaluation of plant, facilities, services, labour and skills distribution used for manufacturing processes against defined process performance parameters. It includes the evaluation and assessment of plant layout and material flows for efficient manufacturability of product and maintainability of the plant and process.

Application of the Unit

This unit applies to manufacturing processes for products, machinery, tools or components for structures. Evaluations may be required for a variety of reasons, including assessing impact of proposals for new products or investigating potential change in processes to meet regulatory, sustainability or efficiency requirements. Efficiency evaluations are based on lean systems and techniques. Where more in-depth training in lean systems and techniques is required relevant competitive systems and practices units should be selected.

The unit is suitable for people working as, supervisors, technicians, and design draftspersons and those pursuing manufacturing, engineering or related technical qualifications and careers.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

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Elements and Performance Criteria

1	Determine scope of manufacturing processes	1.1	Identify manufacturing context and processes
		1.2	Identify features and functions of plant, facilities, services, labour and skill distribution used for manufacturing processes
		1.3	Identify stakeholders to be consulted as part of the evaluation
		1.4	Confirm work health and safety (WHS) and regulatory requirements, codes of practice, standards, risk assessment and registration requirements for manufacturing plant
		1.5	Investigate sustainability implications of manufacturing processes
		1.6	Identify sources of professional and technical assistance
2	Evaluate manufacturing processes	2.1	Identify manufacturing principles and techniques required to evaluate and optimise the processes
		2.2	Identify appropriate analysis techniques, software and software validation techniques
		2.3	Evaluate and assess facilities, services, plant and tooling in relation to product manufacturability and maintainability
		2.4	Evaluate and assess process layout, use of automation and process control using lean systems and techniques
		2.5	Evaluate and assess materials, product flow and transfer operations, buffer and emergency stocks, warehousing, stores and logistics using lean systems and techniques
		2.6	Evaluate WHS and regulatory compliance and risk management practices of manufacturing processes and maintenance procedures
		2.7	Evaluate processes for sustainability

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		2.8	Evaluate process compatibility with maintenance management system
		2.9	Evaluate labour requirements and skills distribution
		2.10	Evaluate process information flows for control and process improvement
3	Report results	3.1	Review results of evaluation and assessment with stakeholders
		3.2	Provide recommendations for improvements, where appropriate
		3.3	Provide reports and documentation, such as layouts, programs and flow charts

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying parameters and context of manufacturing processes
- investigating sustainability implications of manufacturing processes
- identifying appropriate manufacturing processes and analysis techniques and software
- evaluating WHS and regulatory requirements, automation safety and risk management compliance, sustainability and standards
- investigating existing or planned software against manufacturing technical and efficiency requirements
- applying lean systems and techniques to evaluate:
  - facilities and services
  - plant and tooling
  - process layout
  - automation and process control
  - materials and product flow
  - buffer and emergency stocks
  - stores and warehousing
  - transport and logistics

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    - maintenance management system
    - labour and skill requirements
- reporting and documenting results of scoping, principles and techniques identification and evaluation of systems, layouts, programs and flow charts

Required knowledge

Required knowledge includes:

- important features of products and processing options with regard to:
    - maketing options and advantages
    - economic, social and sustainability implications of products and processes
    - WHS and other regulatory requirements
- plant, facilities, services and process layout
- range of common modern manufacturing technical and work organisation processes, including:
    - volume production using transfer lines
    - cellular manufacturing
    - jobbing
    - metal shaping processes, such as casting, forging and machining
    - metal assembly, fabricating and joining
    - plastic and rubber product manufacturing, including various types of moulding and assembly
    - surface finishing based processes (e.g. electroplating)
    - process transfers and materials handling
    - packaging
    - warehousing, stores, and provision for logistics and transport
- labour and skills distribution requirements of plant and processes
- asset maintainability and reliability concepts and processes
- process automation and control options
- techniques for process improvement, including:
    - material and product flow measurement and improvement
    - feedback on product manufacturability for possible product modification
    - feedback from maintenance and life cycle costs for plant
    - quality assurance (QA), quality control (QC) and statistical process control (SPC) feedback
    - customer feedback on cost, quality, delivery and reliability
- maintenance management systems and compatability with manufacturing processes
- information flows and software options for process measurement and control
- budgeting and costing processes
- WHS, risk management, safe work methods statements (SWMS), work permits, material safety data sheets (MSDS), codes of practice, regulations, standards and regulatory

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requirements

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to evaluate plant, facilities, services and processes against defined process performance parameters. This includes working individually and as part of a team in accordance with organisational procedures.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • determine features and functions of manufacturing processes, including manufacturing principles and techniques used and relevant internal and external context of manufacturing processes • identify relevant lean systems and techniques and apply in evaluation of manufacturing processes • evaluate WHS, regulatory, automation safety and risk management compliance • investigate sustainability implications of manufacturing processes • evaluate software, facilities, services, plant and equipment tooling, process layout, automation and process control • identify appropriateness of materials and product flow and transfer operations, buffer and emergency stocks, warehousing, stores and compatibility of maintenance management system • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be

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	made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Defined parameters	Defined parameters may include • target cost • target outgoing quality levels and warranty costs

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	• production rates • stock levels and availability to customer order • productivity • working capital • plant utilisation
Context of manufacturing processes	The context of manufacturing operations includes: • customer requirements • market considerations • product and process sustainability • lean systems • product manufacturability • system maintainability • facilities, services, plant and tooling requirements • supply chains • material and product flow • transfer operations • process control • labour requirements and skills distribution • information flow • systems thinking • continuous improvement and constraint and contingency management • WHS and regulatory requirements and risk management
Automation safety	Automation safety refers to the reliance on emergency stop, failsafe design, redundancy, interlocks and data integrity. Standards apply to general plant design and use as well as the functional safety of safety-related electrical, electronic and programmable electronic control systems

Appropriate technical and professional assistance	Appropriate technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment,

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	sealing and fastening
WHS, regulatory requirements, codes of practice and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements applying to electrical work
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular manufacturing process
Sustainability	Sustainability is used to mean the entire sustainable performance of the organisation/plant including: • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer
Continuous improvement implementation	Continuous improvement of manufacturing processes may result in changes to plant, facilities, services, layout, materials flows, handling and logistics. It may include techniques, such as: • balanced scorecard • current and future state mapping • measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training • systems thinking • constraints and contingency management
Lean systems and	Lean systems and techniques used in evaluations can vary

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techniques	according the type of production and product and may include:
	• performance indicators based on customer value
	• continuous improvement, including kaizen
	• just-in-time (JIT) and kanban
	• pull system for production and services
	• elimination and/or limitation of waste, where waste is defined as effort and resources not contributing to customer value
	• mistake proofing
	• standardisation of work
	• quick changeover
	• planning benchmarks and techniques:
	  • cycle time
	  • takt time
	  • pack out
	  • pitch
	  • line balancing
	  • overall equipment effectiveness (availability x performance efficiency x quality rate)
	• problem solving and decision making tools:
	  • total quality management (TQM) tools
	  • root cause analysis (RCA)
	  • failure mode and effects analysis (FMEA)
	  • design review based on failure mode (DRBFM)
	  • constraints and contingencies management
	• total productive maintenance
	• value stream analysis
	• visual factory techniques

Automation	Automation options range from manual operations with manual information generation, handling, analysis and storage to islands of automation supported by manual interfaces with some electronic information processing to systems with major automation and networked data handling
Information flow requirements	Information flow may include: • SPC and QA data • production planning and maintenance systems information • visual information feedback to stakeholders Information processing may include: • software and networks for automated data handling, analysis, display and storage

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Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23124A Measure and analyse noise and vibration

Modification History

Release 1 - New unit. Replaces MEM23094A, but not equivalent.

Unit Descriptor

This unit of competency covers the monitoring, measurement and analysis of noise and vibration. It includes equipment calibration and use, analysis of data, standards for exposure limits, work health and safety (WHS) and mitigation measures.

Application of the Unit

This unit applies to machinery and equipment generated noise and vibration, including mechanical shock generated in commercial and industrial environments.

It is suitable for people working as asset maintenance technicians or noise and vibration specialists. It is suitable for people working as technicians in engineering or related industries and those pursuing careers and qualifications in engineering or related disciplines.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

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Elements and Performance Criteria

1	Determine scope of investigation into noise or vibration	1.1	Identify machinery and equipment to be investigated for noise and vibration measurement and analysis
		1.2	Determine stakeholders to be consulted on analysis tasks
		1.3	Determine software required for the analysis of the task
		1.4	Determine regulatory, standards and risk management noise and vibration compliance requirements
		1.5	Investigate sustainability implications of noise and vibration
		1.6	Apply systems thinking, continuous improvement problem solving and constraint and contingency management
		1.7	Determine available sources for any required technical and professional assistance
2	Prepare for noise measurement and analysis	2.1	Identify noise exposure limits appropriate to the equipment, process and employee, community and environmental context
		2.2	Review and identify available sound measuring equipment and components and suitability for required measurements
		2.3	Select sound measuring equipment
3	Measure and analyse sound data	3.1	Set up and site sound measurement equipment for desired measurements
		3.2	Calibrate sound measurement equipment
		3.3	Take sound measurements using appropriate techniques for particular application and environment
		3.4	Process, analyse and interpret noise data

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		3.5	Relate data to plant and equipment performance
4	Review options for noise elimination or mitigation and protection	4.1	Review options for noise elimination, mitigation and protection measures
		4.2	Prepare report and make recommendations
5	Prepare for vibration measurement and analysis	5.1	Identify vibration exposure limits appropriate to the equipment, process and employee, community and environmental context
		5.2	Review and identify available vibration measuring equipment and components and suitability for required measurements
		5.3	Select vibration measuring equipment
6	Measure and analyse vibration and shock data	6.1	Set up and site or mount vibration and shock measurement equipment
		6.2	Calibrate equipment
		6.3	Take measurements
		6.4	Process, analyse and interpret vibration and shock data
		6.5	Relate data to plant and equipment performance
7	Review options for vibration and shock elimination or mitigation and protection	7.1	Review options for vibration and shock elimination or damping and isolating
		7.2	Prepare report and make recommendations
8	Investigate developments in the field of noise and vibration measurement in	8.1	Investigate developments in acoustic, vibration and shock measurement
		8.2	Investigate the use of condition monitoring in predictive maintenance programs

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predictive
equipment
maintenance

9	Record and report	9.1	Record and report results of review, measurement, analysis and recommendations
		9.2	Provide documentation, such as calculations, data records and analysis and assessments

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- determining parameters and context of noise and vibration measurement and analysis tasks
- determining WHS, other regulatory and risk management compliance requirements, including noise and vibration, noise dose and vibration exposure limits
- reviewing physics of sound and vibration, effects of noise, vibration and shock on humans, measuring equipment and mitigation measures
- selecting equipment
- siting, setting up and calibrating equipment prior to use
- measuring, analysing, interpreting and recording
- relating data to plant and equipment performance
- applying systems thinking, continuous improvement problem solving and constraint and contingency management
- investigating sustainability implications, developments in acoustic, vibration and shock measurement, condition monitoring in predictive maintenance programs
- recording, reporting and documenting results of review, measurement, data, analysis and calculations, interpretations and recommendations

Required knowledge

Required knowledge includes:

- characteristics and measurement of noise and vibration, and sources of noise and vibration
- noise and vibration concepts and terminology
- ISO and other vibration severity standards
- limitations of broadband vibration and trend analysis

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- principles of using vibration analysis as an indicator of machine and equipment condition
- causes and effects of vibration and noise in industrial and commercial equipment, such as damaged product, limited processing speeds and catastrophic machine failure
- typical engineering components subject to vibration
- relevant WHS and regulatory requirements, codes of practice, standards, risk minimisation and registration requirements
- calculations, formulae and laws relating to vibration and sound measurement, including allowable exposure using AS 2670 Physiological effects of noise and vibration
- range and capacity of equipment for measuring vibration and sound
- noise measurement and testing techniques and equipment for various environments and sound characteristics in vibration measurement and testing
- acoustic emission in vibration measurement and testing
- shock testing, including applications requiring laboratory testing (e.g. anechoic chambers)
- vibration trend analysis
- noise and vibration concepts (e.g. vibration, noise, transmission of noise and vibration and harmonic excitation)
- common sources of noise generation (e.g. fans, motors, engines and ducts)
- noise mitigation and protection measures, such as:
  - isolation
  - insulation
  - personal hearing protection
  - exposure limitation policies
- vibration and shock control equipment and techniques
- community noise
  - noise and vibration measurement and analysis applications, such as:
  - condition monitoring for plant
  - acoustic emissions for fault detection
  - modal analysis of dynamic properties of structures or room acoustics
  - correlation of modal analysis with finite element analysis (FEA)
  - statistical energy analysis

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to measure and analyse noise and vibration and make recommendations for mitigation and protection.
Critical aspects for	Assessors must be satisfied that the candidate can competently

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assessment and evidence required to demonstrate competency in this unit	and consistently: • determine compliance with WHS and regulatory requirements, and risk management with particular emphasis on automation safety • review physics of sound and vibration, effects of noise, vibration and shock on humans, measuring equipment and mitigation measures • identify noise and vibration, noise dose and vibration exposure limits • select appropriate measuring equipment for measuring task • calibrate, site and set up equipment • correctly measure and record noise and vibration • analyse and interpret measurement results • relate data to plant and equipment performance • recommend noise and vibration elimination, mitigation and protection measures • investigate sustainability implications • report and document results and recommendations • apply systems thinking, continuous improvement problem solving and constraint and contingency management.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process.

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	• Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Sound measuring equipment	Sound measuring equipment may include: • microphones • cables/connectors • meters • recorders • analysers/comper and software
Set-up and measurement techniques	Set-up and measurement techniques may include: • microphone positioning • meter time constants • frequency filter settings
Purpose for sound measurements	Purposes for sound measurements may include: • simple sound level or spectrum • limited or full frequency band • standards to be met • impulsive or consistant noise
Vibration	Vibration refers to continuous or sporadic vibration whether or not associated with noise and also includes mechanical shock
Vibration and shock measuring equipment	Vibration and shock measuring equipment may include: • accelerometer • impedance heads

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	• cables • mounting media • calibrators • preamplifier • meters • filters • recorders • analysers/computer and software

Appropriate technical and professional assistance	Appropriate technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Standards and codes	Standards and codes refer to all relevant Australian and International standards and codes applicable to a particular noise and vibration measurement and analysis task
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and

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	techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain
Continuous improvement	Continuous improvement implementation may relate to plant, products, processes, systems or services, including design, development, implementation or manufacture, commissioning, operation or delivery and maintenance. Improvement processes may include techniques, such as: • balanced scorecard • current and future state mapping • measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training
Constraints and contingencies	Constraints and contingencies may be: • financial • organisational, procedural or cultural • physical constraints, such as limits to resources, limits to site access or logistical limitations

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM23125A Evaluate maintenance systems

Modification History

Release 1 - New unit. Replaces MEM23094A, but not equivalent.

Unit Descriptor

This unit of competency covers the evaluation of maintenance management systems, including analysing the effect of any action or breakdown on achieving strategic objectives. The unit requires evaluation of maintainability and reliability of assets, maintenance management systems, personnel participation, monitoring, responding to indicators, prioritising action, sustainability, lean systems maintenance requirements, work health and safety (WHS) compliance, risk minimisation, facilities and services maintenance, costing and data analysis, and performance indices.

Application of the Unit

This unit applies to evaluation of both corrective and preventative maintenance systems for plant, facilities and services used in industry. Evaluations may be required for variety of purposes and may apply to evaluations of a maintenance system for a whole process, plant or enterprise. The unit is suitable for operations managers, maintenance personnel and those pursuing maintenance or manufacturing, engineering or related technical qualifications and careers.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM14088A	Apply maintenance engineering techniques to equipment and component repairs and modifications
MEM14092A	Integrate maintenance fundamentals into an engineering task

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element.

Elements and Performance Criteria

1	Determine scope of maintenance processes	1.1	Determine parameters of maintenance management system to be evaluated
		1.2	Assess engineering principles, skills and techniques required by tasks
		1.3	Assess software and software techniques required for evaluation task
		1.4	Identify stakeholders to be consulted
		1.5	Determine compliance requirements of WHS and regulatory requirements, codes of practice, standards and risk assessment requirements for maintenance processes
		1.6	Investigate sustainability implications of maintenance processes
2	Identify principles and techniques required by evaluation	2.1	Review trends in maintenance practice and equipment with particular emphasis on integrated management systems
		2.2	Review maintenance system and implementation strategies for relevance to evaluation
		2.3	Identify features and functions of maintenance information systems
3	Evaluate	3.1	Evaluate organisational maintenance safety and risk

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	maintenance management systems		management procedures
		3.2	Evaluate maintenance processes for sustainability
		3.3	Evaluate asset reliability, maintainability and performance against against lean indices, production targets and system design parameters
		3.4	Audit plant, facilities, services and systems for provision of parts and consumables, adequacy of labour, skills and technical support
		3.5	Evaluate maintenance system data generation and collection and reporting for performance analysis required for process improvement
		3.6	Evaluate the use of maintenance management software
		3.7	Evaluate manual and automated condition monitoring, testing and analysis
		3.8	Evaluate implementation of maintenance management systems techniques, including up-time preparations, spares availability, tooling and equipment readiness
		3.9	Evaluate asset categorisation, maintenance scheduling and prioritising
		3.10	Evaluate implementation of maintenance continuous improvement processes
4	Report results	4.1	Record results of scoping, principles and techniques identification and evaluation of maintenance systems
		4.2	Provide documentation, such as layouts, schedules, performance analysis and flow charts

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

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- identifying WHS, regulatory and risk management compliance requirements for maintenance systems
- investigating sustainability implications of maintenance processes
- identifying and reviewing features and functions of maintenance and information systems, trends and implementation strategies and software
- evaluating organisational maintenance safety and risk management procedures, sustainability, asset reliability and maintainability, lean indices, system design parameters, data generation and collection, reporting, storage and analysis, condition monitoring, implementation, facilities and services maintenance response systems, asset categorisation, maintenance scheduling and prioritising, and continuous improvement
- auditing plant, facilities and services, systems for provision of parts and consumables, and adequacy of labour, skills and technical support for maintenance activities
- reporting and documenting results of scoping, principles and techniques identification and evaluation of maintenance systems, layouts, schedules, performance analysis, flow charts, calculations, programs and files

Required knowledge

Required knowledge includes:

- maintenance requirements of various organisations and industry trends
- features of integrated management systems within organisations and industry trends:
  - monitoring, adjustment, lubrication, consumables, breakdown maintenance required by typical plant equipment and facilities
  - labour and training requirements for typical maintenance systems
  - maintenance performance indices, such as mean time between failure (MTBF) and overall equipment efficiency (OEE), and relationship to maintenance strategies, business financial objectives and maintenance system design criteria, such as life cycle cost and break-even point
  - maintenance management systems, such as terotechnology
  - maintenance management within ILS
- sources of information, software and hardware required by maintenance systems
- systems thinking in relation to maintenance, failure analysis, problem solving and decision making processes, constraint and contingency management
- compliance requirements of WHS, regulations and standards relevant to maintenance
- risk management requirements and analyses for maintenance of plant, including failure mode effects analyses (FMEA)
- maintainability and reliability related to life cycle costing, system design, cost predictions and break-even analysis
- audit processes for plant, facilities and services, provision of parts and consumables, labour, skills and technical support
- maintenance system data generation and collection, reporting and response processes, data storage and performance analysis for process improvement against performance parameters, such as MTBF and OEE
- manual and automated condition monitoring, testing and analysis

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- maintenance system and implementation strategies, including corrective, preventative, predictive, precision, proactive, total productive and reliability centred maintenance
- facilities and service maintenance response systems
- asset categorisation and maintenance scheduling and prioritising
- organisational maintenance safety procedures, such as:
  - risk management procedures
  - WHS committees
  - standard operating procedures
  - safe work methods statements (SWMS)
  - material safety data sheets (MSDS)
  - permits
  - standards related to significant maintenance or plant modifications
- terotechnology
- engineering, plant, facilities and services maintenance requirements
- continuous process improvement
- data generation, analysis, storage and feedback
- reporting techniques and documentation required

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to evaluate maintenance systems and processes for safe, cost-effective and sustainable operation.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • investigate sustainability implications of maintenance processes • identify and review features and functions of maintenance and information systems, trends and implementation strategies and software • evaluate safety and risk management, sustainability, asset reliability and maintainability, lean indices, system design parameters, data generation, collection, reporting, storage and analysis, condition monitoring, facilities and services maintenance response systems, asset categorisation, maintenance scheduling and prioritising, and continuous

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	improvement, implemention • audit plant, facilities and services, provision of parts and consumables provision, labour, skills and technical support • report and document results.
Context of and specific resources for assessment	• This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Appropriate technical and professional assistance	Appropriate technical and professional assistance may include:
	• technical support and advice relating to elements which have intrinsic dangers, such as:
	  • high pressure
	  • energised fluid vessels
	  • high temperatures and heat energy capacity
	  • wiring with high current control voltages above extra low voltage
	• professional support for technologies, such as:
	  • specialist electric motor drives and controllers
	  • specialist materials, plastics, metal alloys and nano materials
	  • special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures	WHS, regulatory requirements and enterprise procedures may include: • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • ministerial directives • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Standards and codes	Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular maintenance system
Systems thinking	Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to

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	perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material, software, internal services and personnel, and other organisations in the value chain
Continuous improvement	Continuous improvement implementation may relate to plant, products, processes, systems or services, including design, development, implementation or manufacture, commissioning, operation or delivery and maintenance. Improvement processes may include techniques, such as: • balanced scorecard • current and future state mapping • measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training
Constraints and contingencies	Constraints and contingencies may be: • financial • organisational, procedural or cultural • physical constraints, such as limits to resources, limits to site access or logistical limitations
Maintenance systems	Maintenance systems include: • breakdown maintenance • preventive maintenance • predictive maintenance (on-condition) • precision maintenance • proactive maintenance • reliability centred maintenance • total productive maintenance
Lean systems maintenance	Lean maintenance systems aim at maximising machine and process up-time, minimising waste and costs, maintaining quality and delivery and customer service. Maintenance processes and procedures are subject to continuous improvement and are set to complement engineering business objectives
Integrated maintenance	Terotechnology is an integrated maintenance management system

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management systems (terotechnology)	combining management, financial, engineering and other practices for cost-effective maintenance of assets, such as plant, equipment and facilities. It involves the design for reliability and maintainability, manufacture, installation, commissioning and eventual write-off and replacement of the assets. Data is collected and analysed to assess the reliability, life cycle costs and productivity of the assets against the design criteria. Reliability relates to the productivity of assets, that is, the maintenance of service or product output (quantities) and its quality within cost parameters. In the context of terotechnology, the cost parameters include life cycle costs
Integrated logistic support (ILS)	ILS is the management and technical process through which supportability and logistic support considerations are integrated into the design and taken into account throughout the life cycle of systems/equipment and by which all elements of logistic support are planned, acquired, tested, and provided in a timely and cost-effective manner. Maintenance systems and schedules are part of this process

Maintenance priority	Assets may be prioritised for maintenance according to different criteria and categories, such as:
	• critical assets:
	  • high cost of replacement
	  • unavailability of replacement or spares
	  • failure will or may immediately endanger life and property
	  • essential to quality
	  • high cost of disruption to production or service delivery
	  • failure would require an immediate response
	• semi-critical assets:
	  • shutdown produces partial loss of capacity
	  • assett is regulated
	  • difficult to repair
	  • alternative asset may be available
	  • some spare parts are stored
	  • medium priority for response
	• non-critical:
	  • breakdown affects minimal production loss
	  • asset used infrequently
	  • parts readily available
	  • lowest priority attended to as time and resources allow

Maintenance activity	An audit of plant, facilities and services may be used to identify maintenance requirements with details listed in the maintenance

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audit	database according to different criteria, such as: • criticality, locality, machine type and maintenance activities required • skills and techniques required for corrective actions • sources and availability of spares • specialised corrective skills and techniques for specific equipment
Maintainability	Maintainability refers to the design of product, machines and processes with an objective of reducing maintenance downtime, resources, specialist tools and skills required to maintain reliability. Design techniques may include modular design for ease of replacement, provision of bypass opportunities to isolate the failure for repair while processes continue or provision of substitute equipment
Monitoring and testing	Monitoring and testing may be undertaken for both corrective and proactive and predictive maintenance. Tests may include: • manual inspections • instrumented monitoring • lubricant testing (tribology) • lidar (light for atmospheric particle detection) • gas chromatography • mandatory inspections • performance and condition monitoring • radiographic examination for material imperfections • microwave for non-metallic solid or liquid test • camera and scope techniques

Maintenance system data	Maintenance system data may include:
	• asset ID and plant warranties
	• procedural documents:
	  • monitoring and preventative maintenance schedules
	  • SWMS
	  • MSDS
	  • work permits
	• monitoring reports and system measurements
	• maintenance actions and costs
	• spares inventory control

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Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.

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MEM24001B Perform basic penetrant testing

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing basic penetrant testing procedures in a range of industrial applications.

Application of the Unit

Application of the unit	This unit applies to basic penetrant testing techniques on fabrications, structures and components across a wide range of industries and restricted to basic visible dye and/or process penetrant line methods. The work can relate to scheduled and unscheduled maintenance activities, using general tools, specific penetrant testing equipment as specified in maintenance documentation, testing procedures or operator instructions. Actual and potential defects are to be considered, together with ongoing abnormalities in fabrications, components and structures. Penetrant testing is performed on critical component or structural zones. All testing must be completed with particular attention to personal safety and OH&S regulations. Certification against Australian standards may be achieved where assessment in this unit of competency is carried out in conjunction with an examining authority as described in ISO 9712. Materials and chemicals which are subject to codes and regulations - for example, chemicals, explosives, solvents, dangerous materials, acids, or noxious waste products - must be subject to safe work habits and must be stored and used in accordance with safe work practices. This unit should not be selected when Unit MEM24002B

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	(Perform penetrant testing) has already been selected. Where power tools are required, Unit MEM18002B (Use power tools/hand held operations) should also be selected. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare inspection areas for basic penetrant testing	1.1. Inspection areas are cleaned and prepared for testing using appropriate procedures and materials. 1.2. Preparation processes are carried out in accordance with the relevant procedures and OH&S requirements. 1.3. Inspection areas are visually assessed and obvious discontinuities are identified.
2. Perform basic penetrant testing	2.1. Nominated test is identified from standard operating procedures. 2.2. Test equipment is prepared in accordance with standard operating procedures. 2.3. Test media is selected and applied in accordance with workplace practices and specifications. 2.4. Penetrant test is carried out in accordance with relevant work instructions and OH&S requirements. 2.5. Penetrant testing equipment is maintained and stored in accordance with standard operating procedures and OH&S requirements.
3. Report the results of penetrant test(s)	3.1. Basic indications are checked and defects are identified in accordance with enterprise standards and/or procedures. 3.2. Basic indications are confirmed in accordance with enterprise standards and/or procedures. 3.3. Test results are reported in accordance with enterprise standards and/or procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • preparing inspection areas • identifying discontinuities • applying procedures

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REQUIRED SKILLS AND KNOWLEDGE
• applying test media • applying principles of penetrant testing techniques • identifying defects • reading and interpreting routine information on written job instructions, specifications and standard operating procedures. • following oral instructions • entering routine and familiar information onto proformas and standard workplace forms
Required knowledge
Look for evidence that confirms knowledge of: • cleaning and preparation processes • precleaning methods and their areas of use - solvents, vapour degrease, etching, detergents, paint removers, mechanical methods • consequences of incorrect preparation • procedures and OH&S requirements in relation to the preparation process • basic concepts and principles of NDT; general terms, purpose of NDT and areas of application of NDT • scope and basic description of test • general properties of penetrants - penetrability, removability, visibility • emulsifier types • developer types • use of standard test panels • established inspection procedures and techniques • types of discontinuities and their consequences • procedure for carrying out penetrant testing • penetrant application • dwell times • penetrant removal • developer application • dry powder • development time • factors affecting indications • non-relevant indications • post-cleaning methods and their areas of use • basic maintenance and storage procedures for testing equipment • OH&S requirements including storage requirements • definition of a defect and common basic defects • methods/procedures for reporting test results

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform basic penetrant testing. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing basic penetrant testing or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures,

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EVIDENCE GUIDE	
	product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Preparation processes	Surface cleaning and drying
Obvious discontinuities	Observed changes in material homogeneity
Reported	Accurate identification of location and size of discontinuities

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Non-destructive testing

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MEM24002B Perform penetrant testing

Modification History

Single band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit covers performing penetrant testing in a range of industrial applications.

Application of the Unit

Application of the unit	This unit applies to penetrant testing techniques on fabrications, structures and components across a wide range of industries to Level 2 (AS 3669 and AS 3998) or equivalent by portable penetrant testing, processing on a dedicated penetrant line, visible dye and fluorescent methods. The work can relate to scheduled and unscheduled maintenance activities using general tools and specific penetrant testing equipment as specified in maintenance documentation, testing procedures or operator instructions. Actual and potential defects are to be considered, together with ongoing abnormalities in fabrications, components, structures and/or aircraft components. Penetrant tests are performed on critical component or structural zones, and may require re-assessment of competency at regular intervals in accordance with Australian standards and/or other relevant standards. All testing must be completed with particular attention to personal safety and OH&S regulations. Certification against Australian Standards may be achieved where assessment in this unit of competency is carried out in conjunction with an examining authority as described in ISO 9712. Materials and chemicals which are subject to codes and regulations - for example, chemicals, explosives, solvents, dangerous materials, acids, or noxious waste products - are subject to safe work habits and must be stored and used in accordance with safe work practices.

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	Where power tools are required, Unit MEM18002B (Use power tools/hand held operations) should also be selected. Where tests require the interpretation of drawings, Unit MEM09002B (Interpret technical drawings) should also be selected. **Band:** This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C5 (AQF level V). **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM18001C	Use hand tools
	MEM24012C	Apply metallurgy principles

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range

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	statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare inspection areas for penetrant testing	1.1. Inspection areas are identified, cleaned and prepared for testing using appropriate procedures and materials. 1.2. Preparation processes are carried out in accordance with the relevant procedures, statutory and OH&S requirements. 1.3. Inspection areas are visually assessed and obvious discontinuities are identified.
2. Perform penetrant testing	2.1. The most appropriate penetrant test for the material/application is selected. 2.2. Test equipment is selected and prepared in accordance with standards and/or procedures. 2.3. Appropriate test media is selected and applied in accordance with workplace/industry practices. 2.4. Penetrant test is carried out in accordance with relevant standards, specifications and OH&S requirements. 2.5. Penetrant test equipment is checked for defects, maintained and stored in accordance with procedures, OH&S requirements and manufacturer instructions.
3. Interpret and report the results of penetrant test(s)	3.1. Indications are assessed and defects are detected and classified in accordance with national and international codes and standards. 3.2. Defects are confirmed in accordance with enterprise procedures and industry practices. 3.3. Test results are reported in accordance with enterprise procedures, accepted industry practices and customer service requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- interpreting and following procedures
- identifying inspection areas
- conducting visual inspections
- identifying discontinuities and defects
- selecting appropriate testing techniques and procedures
- using decision making skills
- assessing risk
- performing measurements needed to meet the requirements of this unit
- entering routine and familiar information onto proformas and standard workplace forms
- locating, reading and interpreting information on written job instructions, specifications, drawings, charts, lists and other reference documentation
- planning, sequencing operations

Required knowledge

Look for evidence that confirms knowledge of:

- cleaning and preparation processes for a range of test surfaces
- procedure, statutory and OH&S requirements in relation to the preparation process
- established assessment procedures and techniques
- types of discontinuities and their consequences/effect on the material
- penetrant testing techniques and procedures for a range of situations
- tools, equipment, techniques
- principles and applications of penetrant testing techniques
- hazards and safety requirements associated with penetrant testing
- maintenance and storage procedures for test equipment
- common faults and damage
- range of defects
- meaning and application of national and international codes and standards
- methods/procedures for reporting test results
- implications of test results for the particular material/application
- any applicable industry standards, national/Australian standards, NOHSC guides, State/Territory regulatory codes of practice/standards
- use and application of personal protective equipment
- safe work practices and procedures
- relevant hazards and control measures related to the competency

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform penetrant testing. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing penetrant testing in a range of industrial applications or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any

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EVIDENCE GUIDE	
	relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Preparation processes	Surface cleaning and drying
Obvious discontinuities	Observed changes in material homogeneity
Reported	Accurate identification of location and size of discontinuities

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Co-requisite units		

Competency field

Competency field	Non-destructive testing

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MEM24003B Perform basic magnetic particle testing

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing basic magnetic particle testing procedures in a range of industrial applications. It covers the principles of magnetism and the associated application of basic magnetic particle testing techniques in the field of non-destructive testing. Knowledge of metallurgy associated with the level of application in this unit is required.

Application of the Unit

Application of the unit	This unit applies to portable and fixed ('yoke' or 'bench') basic magnetic particle testing techniques on fabrications, structures and components across a wide range of industries. The work can relate to scheduled and unscheduled maintenance activities using general tools and specific magnetic testing equipment as specified in maintenance documentation, testing procedures or operator instructions. Actual and potential defects are considered, together with ongoing abnormalities in fabrications, components and structures. Magnetic particle testing is performed on critical component or structural zones. All testing must be completed with particular attention to personal safety and OH&S regulations. Certification against Australian standards may be achieved where assessment in this unit of competency is carried out in conjunction with an examining authority as described in ISO 9712. Materials and chemicals which are subject to codes and regulations - for example, chemicals, explosives, solvents, dangerous materials, acids, or noxious waste products - must be subject to safe work habits and must be stored and used in accordance with safe work practices.

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	This unit should not be selected when Unit MEM24004B (Perform magnetic particle testing) has already been selected. Where power tools are required, Unit MEM18002B (Use power tools/hand held operations) should also be selected. Where tests require the interpretation of drawings, Unit MEM09002B (Interpret technical drawings) should also be selected. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range

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	statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare inspection areas for basic magnetic particle testing	1.1. Inspection areas are cleaned and prepared for testing using appropriate procedures and materials. 1.2. Preparation processes are carried out in accordance with the relevant specifications and OH&S requirements. 1.3. Inspection areas are visually assessed and obvious discontinuities are identified.
2. Perform basic magnetic particle testing	2.1. Nominated 'yoke' or 'bench' magnetic particle testing procedure is identified from standard operating procedures. 2.2. Test equipment is prepared in accordance with relevant standards and/or procedures. 2.3. Magnetic particle test is carried out in accordance with relevant work instructions and OHS requirements. 2.4. Magnetic particle testing equipment is maintained and stored in accordance with standard operating procedures and OH&S requirements.
3. Report the results of magnetic particle test(s)	3.1. Basic indications are checked and defects are identified in accordance with enterprise standards and/or procedures. 3.2. Basic indications are confirmed in accordance with enterprise standards and/or procedures. 3.3. Test results are reported in accordance with enterprise standards and/or procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE

Required skills

Look for evidence that confirms skills in:

- interpreting and following procedures
- identifying inspection areas
- identifying discontinuities and defects
- selecting appropriate testing techniques and procedures
- assessing risks
- entering routine and familiar information onto proformas and standard workplace forms
- locating, reading and interpreting information on written job instructions, specifications, charts, lists and other reference documentation
- planning, sequencing operations

Required knowledge

Look for evidence that confirms knowledge of:

- surface preparation
- procedures and OH&S requirements in relation to the preparation process
- established assessment procedures and techniques
- types of discontinuities and their consequences
- scope and basic principles of magnetic particle testing
- procedure for carrying out magnetic particle test using either the 'yoke' or 'bench'
- advantages and limitations of magnetic particle testing
- hazards and safety precautions associated with magnetic particle testing
- basic maintenance and storage procedures for testing equipment
- common basic defects
- methods/procedures for reporting test results
- advantages, limitations of various equipment
- magnetic particle application - methods for wet, dry particles
- recording and reporting results of simple tests
- safety precautions in testing
- use of toxic, flammable materials, electrical hazards
- use and application of personal protective equipment
- safe work practices and procedures
- relevant hazards and control measures related to the competency

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform basic magnetic particle testing. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing basic magnetic particle testing procedures in a range of industrial applications or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Preparation processes	Surface cleaning and drying

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Non-destructive testing

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MEM24004B Perform magnetic particle testing

Modification History

Single band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit covers performing magnetic particle testing in a range of industrial applications.

Application of the Unit

Application of the unit	This unit applies to magnetic particle testing techniques on fabrications, structures and components across a wide range of industries to Level 2 (AS 3669 and AS 3998) or equivalent. The work can relate to scheduled and unscheduled maintenance activities using general tools specific testing equipment as specified in maintenance documentation, testing procedures or operators instructions. Actual and potential defects are to be considered, together with ongoing abnormalities in fabrications, components, structures and/or aircraft components. Magnetic particle testing is performed on critical component or structural zones, and may require re-assessment of competency at regular intervals in accordance with Australian standards and/or other relevant standards. All testing must be completed with particular attention to personal and OH&S regulations. Certification against Australian Standards may be achieved where assessment in this unit of competency is carried out in conjunction with an examining authority as described in ISO 9712. Materials and chemicals which are subject to codes and regulations - for example, chemicals, explosives, solvents, dangerous materials, acids, or noxious waste products - are subject to safe work habits and must be stored and used in accordance with safe work practices. Where power tools are required, Unit MEM18002B (Use power tools/hand held operations) should also be selected.

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	Where tests require the interpretation of drawings, Unit MEM09002B (Interpret technical drawings) should also be selected. **Band:** This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C5 (AQF level V). **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM18001C	Use hand tools
	MEM24012C	Apply metallurgy principles

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare inspection areas for magnetic particle testing	1.1. Inspection areas are identified, cleaned and prepared for testing using appropriate procedures and materials. 1.2. Preparation processes are carried out in accordance with the relevant procedures, statutory and OH&S requirements. 1.3. Inspection areas are visually assessed and obvious discontinuities are identified.
2. Perform magnetic particle testing	2.1. The most appropriate magnetic particle test for the material/application is selected. 2.2. Testing equipment is selected and prepared in accordance with standards and/or procedures. 2.3. Magnetic particle test is carried out in accordance with relevant standards, specifications and OH&S requirements. 2.4. Magnetic particle testing equipment is checked for defects, and maintained and stored in accordance with procedures, OH&S requirements and manufacturer instructions.
3. Interpret and report the results of magnetic particle tests	3.1. Indications are assessed and defects are detected and classified in accordance with national and international codes and standards. 3.2. Defects are confirmed in accordance with enterprise procedures and industry practices. 3.3. Test results are reported in accordance with enterprise procedures, accepted industry practices and customer service requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE

Look for evidence that confirms skills in:

- interpreting and following procedures
- identifying inspection areas
- identifying discontinuities and defects
- selecting appropriate testing techniques, equipment and procedures
- reading, interpreting and applying relative testing standards
- reading, interpreting and applying relative conformance standards
- assessing risk
- undertaking calculations using formulae
- entering routine and familiar information onto proformas and standard workplace forms

Required knowledge

Look for evidence that confirms knowledge of:

- cleaning and preparation processes
- procedures and OH&S requirements in relation to the preparation process
- established assessment procedures and techniques
- types of discontinuities and their consequences
- magnetic particle testing techniques and procedures for a range of situations
- system verification checks necessary to carry out the magnetic particle test
- principles and applications of magnetic particle testing
- advantages and limitations of magnetic particle testing
- hazards and safety precautions associated with magnetic particle testing
- basic maintenance and storage procedures for testing equipment
- types of magnetism;
- magnetic properties
- magnetic materials
- magnetic circuits
- relative permeability of common engineering materials
- magnetic discontinuity, leakage fields
- types of equipment - portable, stationary, automated etc.
- equipment features
- nature and properties of the various types of magnetising current
- current requirements for testing
- media types - advantages and limitations of dry powders and fluid suspensions
- quality control of media, viewing conditions
- disposal procedures
- environment care
- preparation of parts

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REQUIRED SKILLS AND KNOWLEDGE
• effect of surface coatings on sensitivity • effect of surface roughness • dressing of welds • interpretation of indications • lighting conditions • use of magnification • factors influencing appearance • spurious indications, false indications • surface and sub-surface indications • common basic defects • methods/procedures for reporting test results • any applicable industry standards, national/Australian standards, NOHSC guides, State/Territory regulatory codes of practice/standards • use and application of personal protective equipment • safe work practices and procedures • relevant hazards and control measures related to the competency

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform magnetic particle testing. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must

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	be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing magnetic particle testing in a range of industrial applications or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Preparation processes	Surface cleaning and drying

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Non-destructive testing

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MEM24005B Perform basic eddy current testing

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers operating eddy current testing equipment and performing basic testing procedures in a specific range of industrial applications. Knowledge of metallurgy, electricity, magnetism and electromagnetism associated with the level of application in this unit is required.

Application of the Unit

Application of the unit	This unit applies to the preparation and performance of eddy current testing on fabrications, structures and components across a wide range of industries. It includes wheel bead seat, production line, tube production line and conductivity measurement methods. The work can relate to scheduled and unscheduled maintenance activities using general tools and specific eddy current testing equipment as specified in maintenance documentation, testing procedures or operator instructions. Actual and potential defects are to be considered, together with ongoing abnormalities in fabrications, components and structures. Eddy current testing is performed on critical component or structural zones, and may require re-assessment of competency at regular intervals in accordance with relevant standards. All testing must be completed with particular attention to personal safety and OH&S regulations. Certification against Australian standards may be achieved where assessment in this unit of competency is carried out in conjunction with an examining authority as described in ISO 9712. Materials and chemicals which are subject to codes and regulations - for example, chemicals, explosives, solvents, dangerous materials, acids, or noxious waste products - are subject to safe work habits and must be stored and used in accordance with safe work practices.

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	This unit should not be selected when Unit MEM24006B (Perform eddy current testing) has already been selected. Where tests require the interpretation of drawings, Unit MEM09002B (Interpret technical drawings) should also be selected. Where power tools are required, Unit MEM18002B (Use power tools/hand held operations) should also be selected. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent

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	with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare inspection areas for basic eddy current testing	1.1. Inspection areas are cleaned and prepared for testing using appropriate procedures and materials. 1.2. Preparation processes are carried out in accordance with the relevant procedures and OH&S requirements. 1.3. Inspection areas are visually assessed and obvious discontinuities are identified.
2. Perform basic eddy current testing	2.1. Nominated test is identified from standard operating procedures. 2.2. Test equipment is prepared in accordance with standards and/or procedures. 2.3. Eddy current test procedure is carried out in accordance with relevant work instructions and OH&S requirements. 2.4. Eddy current test equipment is maintained and stored in accordance with standard operating procedures and OH&S requirements.
3. Report the results of basic eddy current test(s)	3.1. Basic indications are checked and defects are identified in accordance with enterprise standards and/or procedures. 3.2. Basic indications are confirmed in accordance with enterprise standards and/or procedures. 3.3. Test results are reported in accordance with enterprise standards and/or procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE

Look for evidence that confirms skills in:

- interpreting and following procedures
- identifying inspection areas
- identifying discontinuities and defects
- selecting appropriate testing techniques, equipment and procedures
- documenting and reporting
- assessing risk
- reading and interpreting routine information on written job instructions, specifications and standard operating procedures. May include drawings
- performing calculations using formulae

Required knowledge

Look for evidence that confirms knowledge of:

- cleaning and preparation processes
- procedures and OH&S requirements in relation to the preparation process
- visual inspection
- eddy current instrument set-up
- probe selection
- established assessment procedures and techniques
- types of discontinuities and their consequences
- procedure for carrying out basic eddy current testing
- system verification checks necessary to carry out basic eddy current testing
- testing and compliance standards (enterprise specific)
- standard recording and reporting formats
- standard defects and comparative techniques
- basic principles of electricity, magnetism, electromagnetism and eddy current testing
- basic electrical principles
- test principles
- overview of factors affecting eddy current response
- basic metallurgy
- limitations of eddy current testing
- hazards and safety precautions associated with eddy current testing
- basic maintenance and storage procedures for testing equipment
- common basic defects (these are industry-specific and relevant workplace defects should be chosen)
- methods/procedures for reporting test results
- use and application of personal protective equipment

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform basic eddy current testing. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with operating eddy current testing equipment and applying basic testing procedures in a specific range of industrial applications, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be

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	permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Preparation processes	Surface cleaning and drying

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Non-destructive testing

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MEM24006B Perform eddy current testing

Modification History

Single band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit covers performing eddy current testing in a range of industrial applications.

Application of the Unit

Application of the unit	This unit applies to inspection, interpretation, classification and reporting of results of eddy current testing on fabrications, structures and components across a wide range of industries to Level 2 (AS 3669 and AS 3998) or equivalent. The work can relate to scheduled and unscheduled maintenance activities using general tools and specific testing eddy current testing tools and equipment as specified in maintenance documentation, testing procedures or operator instructions. Actual and potential defects are considered, together with ongoing abnormalities in fabrications, components, structures and/or aircraft components. Eddy current tests are performed on critical component or structural zones, and may require re-assessment of competency at regular intervals in accordance with Australian standards and/or other relevant standards. All testing must be completed with particular attention to personal safety and OH&S regulations. Certification against Australian standards may be achieved where assessment in this unit of competency is carried out in conjunction with an examining authority as described in ISO 9712. Materials and chemicals which are subject to codes and regulations - for example, chemicals, explosives, solvents, dangerous materials, acids, or noxious waste products - are subject to safe work habits and must be stored and used in accordance with safe work practices. Where power tools are required, Unit MEM18002B (Use power tools/hand held operations) should also be selected.

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	Where tests require the interpretation of drawings, Unit MEM09002B (Interpret technical drawings) should also be selected. **Band:** This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C5 (AQF level V). **Unit Weight**: **6**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM18001C	Use hand tools
	MEM24012C	Apply metallurgy principles

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare inspection areas for eddy current testing	1.1. Inspection areas are identified, cleaned and prepared for testing using appropriate procedures and materials. 1.2. Preparation processes are carried out in accordance with the relevant procedures, statutory and OH&S requirements. 1.3. Inspection areas are visually assessed and obvious discontinuities are identified.
2. Perform eddy current testing	2.1. The most appropriate eddy current test for the material/application is selected. 2.2. Test equipment is selected and prepared in accordance with standards and/or procedures. 2.3. Eddy current test is carried out in accordance with relevant standards, specifications and OH&S requirements. 2.4. Eddy current test equipment is checked for defects, and maintained and stored in accordance with procedures, OH&S requirements and manufacturer instructions.
3. Interpret and report the results of eddy current tests	3.1. Indications are assessed and defects are detected and classified in accordance with national and international codes and standards. 3.2. Defects are confirmed in accordance with enterprise procedures and industry practices. 3.3. Test results are reported in accordance with enterprise procedures, accepted industry practices and customer service requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE

Look for evidence that confirms skills in:

- interpreting and following procedures
- identifying inspection areas
- identifying discontinuities and defects
- selecting appropriate testing techniques and procedures
- reading, interpreting and applying relative testing standards
- reading, interpreting and applying relative conformance standards
- using calculations relating to eddy current testing
- assessing risk
- entering routine and familiar information onto proformas and standard workplace forms

Required knowledge

Look for evidence that confirms knowledge of:

- cleaning and preparation processes
- procedures and OH&S requirements in relation to the preparation process
- established assessment procedures and techniques
- types of discontinuities and their consequences
- procedure for carrying out eddy current testing
- tools, equipment, techniques and system verification checks necessary to carry out eddy current testing
- basic principles of electricity, magnetism, electromagnetism and eddy current testing:
  - Reactance - field made by eddy current
  - Biot and Savant law - Definition, Practical (right hand) rules
  - Amperes law - Definition, Applications (toroid, infinite coil, flat coil)
  - Lenz law - Definition, Auto-induction factor, Mutual induction factor, Coupling factor
- induced currents - short circuit coil, metallic mass, skin effect, reactance
- cylindrical bars
- theory of eddy currents
- tubes
- geometric defect characterisation
- multiple defects
- characteristics of eddy current probes
- eddy current equipment:
  - transmission
  - reception
  - data presentation

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REQUIRED SKILLS AND KNOWLEDGE
• equipment controls • types of equipment: • physical properties of materials • electrical conductivity • magnetic permeability • applications of eddy curry testing • influence of various parameters on eddy current measurement • defect position and orientation • compensation • structure and geometry of test part • coupling influence • relative speed • limitations of eddy current testing • hazards and safety precautions associated with eddy current testing • basic maintenance and storage procedures for testing equipment • common basic defects • methods/procedures for reporting test results • any applicable industry standards, national/Australian standards, NOHSC guides, State/Territory regulatory codes of practice/standards • use and application of personal protective equipment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform eddy current testing. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency

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EVIDENCE GUIDE	
	in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing eddy current testing in a range of industrial applications, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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RANGE STATEMENT	
situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Preparation processes	Surface cleaning and drying
Obvious discontinuities	Observed changes in material homogeneity
Defects	Corrosion, metal fatigue, deformation in non-ferrous/ferrous alloys steels, fatigue cracks, stress corrosion cracking, heat damage, metal properties sorting, manufacturing defects, coating thickness measurement etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Non-destructive testing

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MEM24007B Perform ultrasonic thickness testing

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing ultrasonic thickness testing in a range of industrial applications. Knowledge of metallurgy associated with the level of application in this unit is required.

Application of the Unit

Application of the unit	This unit applies to inspecting, interpreting and reporting on ultrasonic testing techniques of fabrications, structures and components. Testing is across a wide range of industries and includes identifying abnormalities such as thickness measurement of corrosion, laminations of non-ferrous/ferrous alloys steels, composite materials. The work can relate to scheduled and unscheduled maintenance activities using general tools and specific ultrasonic testing equipment as specified in maintenance documentation, testing procedures or operators instructions. Actual and potential defects are to be considered, together with ongoing abnormalities in fabrications, components and structures on a wide range of applications. Ultrasonic tests are performed on critical component or structural zones, and may require re-assessment of competency at regular intervals in accordance with Australian standards and/or other relevant standards. All testing must be completed with particular attention to personal safety and OH&S regulations. Certification against Australian standards may be achieved where assessment in this unit of competency is carried out in conjunction with an examining authority as described in ISO 9712. Materials and chemicals which are subject to codes and regulations - for example, chemicals, explosives, solvents, dangerous materials, acids, or noxious waste products -

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	are subject to safe work habits and must be stored and used in accordance with safe work practices. This unit should not be selected when Unit MEM24008B (Perform ultrasonic testing) has already been selected. Where tests require the interpretation of drawings, Unit MEM09002B (Interpret technical drawings) should also be selected. Where power tools are required, Unit MEM18002B (Use power tools/hand held operations) should also be selected. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the

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unit of competency.	required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare inspection areas for ultrasonic thickness testing	1.1. Inspection areas are cleaned and prepared for testing using appropriate procedures and materials. 1.2. Preparation processes are carried out in accordance with the relevant procedures and OH&S requirements. 1.3. Inspection areas are visually assessed for obvious discontinuities.
2. Perform ultrasonic thickness testing	2.1. Nominated ultrasonic thickness test is identified from standard operating procedures. 2.2. Test equipment is prepared in accordance with standard operating procedures. 2.3. Ultrasonic tests are carried out in accordance with relevant standards and OH&S requirements. 2.4. Ultrasonic test equipment is maintained and stored in accordance with standard operating procedures and OH&S requirements.
3. Report the results of ultrasonic thickness tests	3.1. Basic thicknesses are identified and explained in accordance with enterprise standards and/or procedures. 3.2. Basic thicknesses are confirmed in accordance with enterprise standards and/or procedures. 3.3. Test results are reported in accordance with enterprise standards and/or procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE

Look for evidence that confirms skills in:

- interpreting and following procedures
- identifying inspection areas
- identifying discontinuities and defects
- selecting appropriate testing techniques, equipment and procedures
- performing calculations
- assessing risk
- entering routine and familiar information onto proformas and standard workplace forms

Required knowledge

Look for evidence that confirms knowledge of:

- cleaning and preparation processes for a variety of test surfaces
- procedures and OH&S requirements in relation to the preparation process
- established assessment procedures and techniques
- basic principles of ultrasonic thickness testing
- properties and behaviour of ultrasound
- basic concepts associated with frequency, velocity, wavelength, amplitude
- generation of ultrasound
- types of discontinuities and their consequences
- procedures for carrying out ultrasonic thickness tests
- tools, equipment, techniques and system verification checks necessary to carry out the ultrasonic thickness test
- advantages and limitations of ultrasonic thickness testing
- hazards and safety requirements associated with ultrasonic thickness testing
- basic maintenance and storage procedures for testing equipment
- common basic defects
- indications and thicknesses
- methods/procedures for reporting test results
- ultrasonic thickness testing equipment
- types of displays:
  - a-scan display
  - b-scan display
- types of couplants, desirable characteristics
- straight beam testing method:
- calibration of thickness testing equipment
- frequency
- probe size and shape
- thickness testing

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REQUIRED SKILLS AND KNOWLEDGE

• plate testing
  • acceptance standards within the scope of this unit
• recording and reporting:
  • job records
  • routine reports
  • codes and standards
• variables affecting test results
• methods of controlling variables
• component variables:
  • size and geometry
  • distance location from entry surface
  • orientation to entry surface
  • reflecting characteristics of back wall
• any applicable industry standards, national/Australian standards, NOHSC guides, State/Territory regulatory codes of practice/standards
• use and application of personal protective equipment
• safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform ultrasonic thickness testing. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not

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EVIDENCE GUIDE	
	in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing ultrasonic thickness testing in a range of industrial applications, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Preparation processes	Surface cleaning and drying

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RANGE STATEMENT	
Obvious discontinuities	Observed changes in material homogeneity
Reported	Accurate identification of location and size of discontinuities

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Non-destructive testing

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MEM24008B Perform ultrasonic testing

Modification History

Single band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit covers operating ultrasonic testing equipment and applying the testing procedure in a range of industrial applications.

Application of the Unit

Application of the unit	This unit applies to inspecting, interpreting, classifying and reporting on ultrasonic testing techniques of fabrications, structures and components. Testing is across a wide range of industries to Level 2 (AS 3669 and AS 3998) or equivalent and includes identifying abnormalities. The work can relate to scheduled and unscheduled maintenance activities using general tools and specific ultrasonic testing equipment as specified in maintenance documentation, testing procedures or operator instructions. Actual and potential defects are to be considered, together with ongoing abnormalities in fabrications, components and structures on a wide range of applications. Ultrasonic tests are performed on critical component or structural zones, and may require re-assessment of competency at regular intervals in accordance with Australian standards and/or other relevant standards. All testing must be completed with particular attention to personal safety and OH&S regulations. Certification against Australian standards may be achieved where assessment in this unit of competency is carried out in conjunction with an examining authority as described in ISO 9712. Materials and chemicals which are subject to codes and regulations - for example, chemicals, explosives, solvents, dangerous materials, acids, or noxious waste products - are subject to safe work habits and must be stored and used in accordance with safe work practices.

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	Where power tools are required, Unit MEM18002B (Use power tools/hand held operations) should also be selected. Where tests require the interpretation of drawings, Unit MEM09002B (Interpret technical drawings) should also be selected. **Band:** This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C5 (AQF level V). **Unit Weight**: **6**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM18001C	Use hand tools
	MEM24012C	Apply metallurgy principles

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range

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	statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare inspection areas for ultrasonic testing	1.1. Inspection areas are identified, cleaned and prepared for testing using appropriate procedures and materials. 1.2. Preparation processes are carried out in accordance with the relevant procedures, statutory and OH&S requirements. 1.3. Inspection areas are visually assessed and obvious discontinuities are identified.
2. Perform ultrasonic testing	2.1. The most appropriate ultrasonic test for the material/application is selected. 2.2. Testing equipment is selected and prepared in accordance with standards and/or procedures. 2.3. Ultrasonic test is carried out in accordance with relevant standards, specifications and OH&S requirements. 2.4. Ultrasonic testing equipment is checked for defects, and maintained and stored in accordance with procedures, OH&S requirements and manufacturer instructions.
3. Interpret and report the results of ultrasonic tests	3.1. Indications are assessed and defects are detected and classified in accordance with national and international codes and standards. 3.2. Defects are confirmed in accordance with enterprise procedures and industry practices. 3.3. Test results are reported in accordance with enterprise procedures, accepted industry practices and customer service requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- interpreting and following procedures
- identifying inspection areas
- identifying discontinuities and defects
- selecting appropriate testing techniques, equipment and procedures
- analysing test results
- reading, interpreting and applying relative testing standards
- reading, interpreting and applying relative conformance standards
- performing calculations relating to ultrasonic testing
- assessing risk
- entering routine and familiar information onto proformas and standard workplace forms

Required knowledge

Look for evidence that confirms knowledge of:

- cleaning and preparation processes for a variety of test surfaces
- procedures and OH&S requirements in relation to the preparation process
- established assessment procedures and techniques
- principles of ultrasonic testing
- variables affecting test selection
- variables affecting test results
- ultrasound - frequency, velocity, wavelength, amplitude
- behaviour of ultrasound at interfaces
- characteristics of ultrasound in materials
- generation of ultrasound
- detection of ultrasound
- the flaw detector
- basic test methods:
  - pulse-echo and transmission methods
  - resonance methods
  - a, b, c, and p scan
  - types of coupling
  - single, dual and two-probe methods
- characteristics and applications associated with probes
- calibration methods
- variables

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REQUIRED SKILLS AND KNOWLEDGE

• contact and immersion test methods
• testing methods and their application
• flaw size evaluation
• interpretation and evaluation:
  • defect types as related to product
  • codes and standards
• recording and reporting:
  • job records
  • routine reports
  • codes and standards
• written procedures:
  • presentation
  • use of standards
• types of discontinuities and their consequences
• procedures for carrying out ultrasonic tests
• tools, equipment, techniques and system verification checks necessary to carry out the ultrasonic test
• advantages and limitations of ultrasonic testing
• hazards and safety requirements associated with ultrasonic thickness testing
• maintenance and storage procedures for testing equipment
• range of defects
• methods/procedures for reporting test results
• any applicable industry standards, national/Australian standards, NOHSC guides, State/Territory regulatory codes of practice/standards
• use and application of personal protective equipment
• safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform ultrasonic testing. Competency in this unit cannot be claimed until all prerequisites have been

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EVIDENCE GUIDE	
	satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with operating ultrasonic testing equipment and the application of the testing procedure in a range of industrial applications, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Preparation processes	Surface cleaning and drying
Obvious discontinuities	Observed changes in material homogeneity
Defects	Corrosion, metal fatigue, deformation in non-ferrous/ferrous alloys steels, composite materials, fatigue cracks, stress corrosion cracking, manufacturing defects, thickness measurement and fit, mechanical and bonded repairs, laminar tearing, welding defects and casting defects and/or aircraft components
Reported	Accurate identification of location and size of discontinuities

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Non-destructive testing

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MEM24009B Perform basic radiographic testing

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing basic radiographic testing procedures in a range of industrial applications. Knowledge of metallurgy associated with the level of application in this unit is required.

Application of the Unit

Application of the unit	This unit applies to working with ionizing radiation in open or closed sites; on fabrications, structures and components across a wide range of industries. The work can relate to scheduled and unscheduled maintenance activities using general tools and specific radiographic testing equipment as specified in maintenance documentation, testing procedures or operators instructions. All testing must be completed with particular attention to personal and OH&S regulations. Ionizing radiation equipment materials and chemicals, which are subject to codes and regulations, must be stored, used, and transported in accordance with safe work practices. Certification against Australian standards may be achieved where assessment in this unit of competency is carried out in conjunction with an examining authority as described in ISO 9712. This unit should not be selected when Unit MEM24010B (Perform radiographic testing) has already been selected. Where power tools are required, Unit MEM18002B (Use power tools/hand held operations) should also be selected. Where tests require the interpretation of drawings, Unit MEM09002B (Interpret technical drawings) should also be selected. **Band**: **A**

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	Unit Weight: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM13013B	Work safely with ionizing radiation
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare inspection areas ready for basic radiographic testing	1.1. Radiographic specimens are cleaned and prepared for testing using appropriate procedures and materials.

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ELEMENT	PERFORMANCE CRITERIA
	1.2. Preparation processes are carried out in accordance with the relevant procedures and OH&S requirements. 1.3. Inspection areas are visually assessed and obvious discontinuities are identified.
2. Set up radiographic test equipment	2.1. Nominated test is identified from standard operating procedures. 2.2. Radiation testing and processing equipment is set up in accordance with standard operating procedures.
3. Carry out basic radiographic tests	3.1. Basic properties of X-rays and gamma rays are identified. 3.2. Safety practices and controls for minimising radiation exposure are applied. 3.3. Radiographic testing and safety equipment is operated in accordance with relevant work instructions and OH&S requirements. 3.4. Films are processed to achieve optimum results.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • interpreting and following procedures • identifying inspection areas • identifying discontinuities and defects • selecting appropriate testing techniques, equipment and procedures • calculating and producing optimum quality radiographs • effectively designing exposure and storage areas • calculating shielding thicknesses • reading, interpreting and applying relative testing standards • reading, interpreting and applying relative conformance standards • documenting and reporting • assessing risk

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REQUIRED SKILLS AND KNOWLEDGE

Required knowledge

Look for evidence that confirms knowledge of:

- cleaning and preparation processes for a range of test surfaces
- cleaning and preparation processes for a range of test surfaces
- assessment procedures and techniques
- types of discontinuities and their consequences/effect on the material
- procedure for carrying out each radiographic test
- principal types of X-ray generators and radioisotopes and their effect on radiographic sensitivity
- tools, equipment, techniques and system verification checks
- relevant standards, regulations and codes
- hazards associated with radiographic testing
- procedures for specialised radiographic applications
- principles of image formation, film and chemical properties and processing techniques
- various types of films and screens, their properties and effects on image quality
- maintenance and storage procedures for test equipment
- common faults and damage
- safety features of radioisotope cameras and X-ray equipment
- production of X-rays and gamma rays
- absorption of ionizing radiation by matter and the biological effects on living
- X-ray equipment
- gamma ray sources
- comparison of X-ray and gamma ray sources on basis of energy and intensity
- shielding thickness
- exposure calculations
- reciprocity law
- preparation and use of exposure charts, radiographic equivalence charts
- exposure techniques
- equipment types
- recording and reporting
- safety aspects
- types of materials
- industrial applications
- set-up procedures
- methods/procedures for reporting test results
- implications of test results for the particular material/application
- any applicable industry standards, national/Australian standards, NOHSC guides, State/Territory regulatory codes of practice/standards

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REQUIRED SKILLS AND KNOWLEDGE
• use and application of personal protective equipment • safe work practices and procedures • relevant hazards and control measures related to the competency

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform basic radiographic testing. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing basic radiographic testing procedures in a range of industrial applications, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be

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EVIDENCE GUIDE	
	gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Preparation processes	Surface cleaning and drying
Obvious discontinuities	Observed changes in material homogeneity

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Non-destructive testing

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MEM24010B Perform radiographic testing

Modification History

Single band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit covers operating radiographic testing equipment and applying the testing procedures in a range of industrial applications.

Application of the Unit

Application of the unit	This unit applies to inspecting, interpreting, classifying and reporting on radiographic testing techniques of fabrications, structures and components. Testing is across a wide range of industries to Level 2 (AS 3669 and AS 3998) or equivalent and includes identifying abnormalities such as corrosion, metal fatigue, deformation in non-ferrous/ferrous alloys steels, composite materials, fatigue cracks, stress corrosion cracking, manufacturing defects, thickness measurement and fit, mechanical and bonded repairs, welding defects and casting defects and/or aircraft components. The work can relate to scheduled and un-scheduled maintenance activities using general tools and specific radiographic testing equipment as specified in maintenance documentation, testing procedures or operators instructions. Actual and potential defects are to be considered, together with ongoing abnormalities in fabrications, components and structures on a wide range of applications. Radiographic tests are performed on critical component or structural zones, and may require re-assessment of competency at regular intervals in accordance with Australian standards and/or other relevant standards. All testing must be completed with particular attention to personal and OH&S regulations. Ionizing radiation equipment materials and chemicals, which are subject to codes and regulations, must be stored,

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	used, and transported in accordance with safe work practices. Certification against Australian standards may be achieved where assessment in this unit of competency is carried out in conjunction with an examining authority as described in ISO 9712. Where power tools are required, Unit MEM18002B (Use power tools/hand held operations) should also be selected. Where tests require the interpretation of drawings, Unit MEM09002B (Interpret technical drawings) should also be selected. **Band:** This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C5 (AQF level V). **Unit Weight**: **6**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM13013B	Work safely with ionizing radiation
	MEM18001C	Use hand tools
	MEM24012C	Apply metallurgy principles

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare inspection areas for radiographic testing	1.1. Inspection areas are identified, cleaned and prepared for testing using appropriate procedures and materials. 1.2. Preparation processes are carried out in accordance with the relevant procedures, statutory and OH&S requirements. 1.3. Inspection areas are visually assessed and obvious discontinuities are identified.
2. Select and prepare radiographic test	2.1. The most appropriate radiographic test for the material/application is selected. 2.2. Appropriate testing and processing equipment is selected and set up for various geometrise in accordance with standards and/or procedures. 2.3. Quality of radiographic test is optimised.
3. Perform radiographic testing	3.1. Radiographic tests are carried out in accordance with relevant standards, codes, specifications and OH&S requirements. 3.2. Radiographs are set up and carried out for specialised applications. 3.3. Films are processed to maximise quality of image. 3.4. Films are processed to achieve optimum results.
4. Maintain radiographic testing equipment	4.1. Radiographic testing equipment is checked for defects, maintained and stored in accordance with procedures, OH&S requirements and manufacturer instructions.
5. Monitor and ensure radiation safety	5.1. Safety controls are set up and maintained. 5.2. Exposure to radiation employees and general public is minimised. 5.3. Radiation monitoring equipment is selected and

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ELEMENT	PERFORMANCE CRITERIA
	used.
6. Interpret and report the results of radiographic tests	6.1. Conditions necessary to view and interpret radiographs are established. 6.2. Radiographs are interpreted/evaluated in accordance with applicable codes, standards and specifications. 6.3. Test results are reported in accordance with enterprise procedures, accepted industry practices and customer service requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • interpreting and following procedures • identifying inspection areas • identifying discontinuities and defects • selecting appropriate testing techniques, equipment and procedures • calculating and producing optimum quality radiographs • effectively designing exposure and storage areas • calculating shielding thicknesses • reading, interpreting and applying relative testing standards • reading, interpreting and applying relative conformance standards • documenting and reporting • assessing risk
Required knowledge
Look for evidence that confirms knowledge of: • cleaning and preparation processes for a range of test surfaces • cleaning and preparation processes for a range of test surfaces • assessment procedures and techniques • types of discontinuities and their consequences/effect on the material • procedure for carrying out each radiographic test • principal types of X-ray generators and radioisotopes and their effect on

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REQUIRED SKILLS AND KNOWLEDGE
radiographic sensitivity • tools, equipment, techniques and system verification checks • relevant standards, regulations and codes • hazards associated with radiographic testing • procedures for specialised radiographic applications • principles of image formation, film and chemical properties and processing techniques • various types of films and screens, their properties and effects on image quality • maintenance and storage procedures for test equipment • common faults and damage • safety features of radioisotope cameras and X-ray equipment • production of X-rays and gamma rays • absorption of ionizing radiation by matter and the biological effects on living • X-ray equipment • gamma ray sources • comparison of X-ray and gamma ray sources on basis of energy and intensity • shielding thickness • exposure calculations • reciprocity law • preparation and use of exposure charts, radiographic equivalence charts. • exposure techniques • equipment types • recording and reporting • safety aspects • types of materials • industrial applications • set-up procedures • methods/procedures for reporting test results • implications of test results for the particular material/application • any applicable industry standards, national/Australian standards, NOHSC guides, State/Territory regulatory codes of practice/standards • use and application of personal protective equipment • safe work practices and procedures • relevant hazards and control measures related to the competency

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform radiographic testing. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with operating radiographic testing equipment and applying testing procedures or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Preparation processes	Surface cleaning and drying

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Non-destructive testing

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MEM24011B Establish non-destructive tests

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers researching, analysing, developing, approving and evaluating non-destructive tests (NDT).

Application of the Unit

Application of the unit	This unit applies to research, development, approval and evaluation of applicable non-destructive tests on fabrications, structures and components across a wide range of industries to Level 3 (AS 3669 and AS 3998) or equivalent. The work can relate to scheduled and unscheduled maintenance activities using general tools and specific testing equipment, test development procedures or guidelines. Activities should replicate 'in-service' tasks due to the high level of self-supervision and the critical nature of the work. Actual and potential defects are considered, together with ongoing abnormalities in fabrications, components, structures from a wide range of applications by the selection of relevant testing method. Tests are validated/evaluated on critical component or structural zones. All testing must be developed and completed with particular attention to personal safety and OH&S regulations. Certification against Australian standards may be achieved where assessment in this unit of competency is carried out in conjunction with an examining authority as described in ISO 9712. Materials and chemicals which are subject to codes and regulations - for example, chemicals, explosives, solvents, dangerous materials, acids, or noxious waste products - are subject to safe work habits and must be stored and used in accordance with safe work practices. This unit should not be selected when Unit MEM05025C

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	(Perform welding fabrication inspection) has already been selected. **Band**: **B** **Unit Weight**: **12**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM13013B	Work safely with ionizing radiation
	MEM16010A	Write reports
	MEM18001C	Use hand tools
	MEM24002B	Perform penetrant testing
	MEM24004B	Perform magnetic particle testing
	MEM24006B	Perform eddy current testing
	MEM24008B	Perform ultrasonic testing
	MEM24010B	Perform radiographic testing
	MEM24012C	Apply metallurgy principles

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Assess requirements for non-destructive test	1.1. Inspection area is assessed for testing and all possible failure sites are identified utilising metallurgical analysis. 1.2. Relevant information for test development is collected from available sources using accepted techniques. 1.3. Information is analysed and interpreted. 1.4. Test requirements are determined.
2. Establish non-destructive test techniques and procedures	2.1. Test methods, techniques and procedures to be used for specific NDT work are designated. 2.2. Codes, standards, specifications and procedures are interpreted. 2.3. Test procedures are developed in accordance with established techniques and metallurgical principles.
3. Validate/confirm non-destructive tests	3.1. General and specific test procedures are validated in accordance with established techniques. 3.2. Inspection results are interpreted and evaluated in terms of existing codes, standards and specifications.
4. Approve non-destructive test procedures	4.1. Procedures are approved in accordance with workplace procedures and relevant codes and standards. 4.2. Procedures are documented and distributed in accordance with workplace requirements and relevant codes and standards.
5. Evaluate non-destructive test procedures	5.1. Procedures are evaluated for effectiveness. 5.2. Evaluation results are documented and reported according to workplace requirements. 5.3. Changes/amendments to non-destructive test

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ELEMENT	PERFORMANCE CRITERIA
	procedures are made and distributed as necessary.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • conducting metallurgical assessment of inspection areas • designating most appropriate method, technique or procedure • referencing information • developing and validating test procedures • applying safety procedures, standard operating procedures and legislative requirements to all work • reading/interpreting/applying relative testing standards • reading/interpreting/applying relative conformance standards • documenting procedure and results
Required knowledge
Look for evidence that confirms knowledge of: • application of metallurgical analysis to assess inspection areas • NDT methods, techniques and procedures • meaning and validity of relevant codes, standards, specifications and procedures • test procedure for testing techniques and specimen • validation processes • process for approval of procedures • process for documentation/distribution of procedures • evaluation procedures • process for documentation of evaluation results • process for amending tests and distributing amendments • any applicable industry standards, national/Australian standards, NOHSC guides, State/Territory regulatory codes of practice/standards • use and application of personal protective equipment • safe work practices and procedures • relevant hazards and control measures related to the competency

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to establish non-destructive tests. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the research, analysis, development, approval and evaluation of non-destructive tests, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and

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EVIDENCE GUIDE	
	documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Non-destructive testing

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MEM24012C Apply metallurgy principles

Modification History

Single band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit covers applying basic metallurgy principles related to selecting appropriate non-destructive testing techniques (NDT) and interpreting the results of NDT tests for metallurgical processes.

Application of the Unit

Application of the unit	This unit applies to knowledge of metallurgy principles, and the relationship between the various non-destructive testing methods and their capabilities and limitations when applied to the detection of specific discontinuities in metals and alloys. The unit applies to employees other than NDT technicians such as metallurgists, welding supervisors etc. who select and order NDT tests and who interpret results provided by tests for metal manufacturing, casting, shaping, and joining processes. The unit does not apply to the conduct of NDT tests. Such variables as the type of discontinuity, manufacturing process and limitations will assist in determining the sequence of testing and the ultimate selection of one non-destructive test method in preference to another. Any testing that may be carried out must be completed with particular attention to personal and OH&S regulations. Where materials and chemicals which are subject to codes and regulations are stored and used - for example, chemicals, explosives, solvents, dangerous materials, acids, or noxious waste products - safe work habits must be considered. **Band:** This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit

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	for progression to C5 (AQF level V). **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA
1. Interpret and apply the principles of solidification and crystal structures in metals and alloys	1.1. Principles of solidification and crystal structures in metals and alloys are interpreted and applied in relation to NDT techniques.
2. Interpret equilibrium diagrams for metals and alloys	2.1. Equilibrium diagram for metal or alloy is correctly sourced 2.2. Equilibrium diagrams are correctly interpreted.
3. Interpret and apply the principles of fusion welding of metals and alloys	3.1. Principles and methods for fusion welding of metals and alloys are applied to NDT test selection. 3.2. Defects in weldments are identified and classified from NDT test results.
4. Interpret and apply the principles of the formation of castings	4.1. Principles and methods used to produce metal castings are applied to NDT test selection. 4.2. Defects in metal and alloy castings are identified and classified from NDT test results.
5. Interpret and apply the principles of steel forging	5.1. Principles and methods used to produce steel forgings are applied to NDT test selection. 5.2. Defects in steel forgings are identified and classified from NDT test results.
6. Interpret and apply the principles of mechanical testing	6.1. Principles of mechanical testing are applied to NDT test selection. 6.2. Defects in metal product are identified and classified from NDT test results

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • research • understanding and applying metallurgy principles • selecting NDT test appropriate to metal or alloy and manufacturing process

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REQUIRED SKILLS AND KNOWLEDGE

Required knowledge

Look for evidence that confirms knowledge of:

- principles of solidification and crystal structures in metal:
  - classification of materials
  - structure of atoms
  - process of solidification
  - crystal structures
  - defects formed during solidification
  - modification of crystal structure
  - heat treatment processes
  - defects formed during heat treatment
- meaning of equilibrium diagrams representative of a range of metals including aluminium, iron, steel and common non-ferrous alloys:
  - alloy systems
  - solid and liquid solubility
  - basic equilibrium diagrams
  - equilibrium diagrams for common alloys
- principles of fusion welding in relation to NDT testing
- defects in fusion welding:
  - processing defects
  - grinding cracks
  - pickling cracks
  - heat treatment cracks
  - service defects
  - fatigue cracks
  - corrosion and stress corrosion cracks
- principles of the formation of castings
- defects in castings
- principles of steel forging
- defects in steel forging
- principles of mechanical testing:
  - mechanical testing
  - tensile testing
  - impact testing
  - hardness testing
  - fatigue testing
- other tests

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply metallurgy principles to NDT test selection and interpretation. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying basic metallurgy principles as related to non-destructive testing techniques, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate

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EVIDENCE GUIDE	
	must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Principles and methods for fusion welding of metals and alloys	• MMAW • SAW • GMAW • GTAW • FCAW
Defects in weldments	Cracks, lack of fusion, cavities, imperfect shape, solid inclusions, miscellaneous
Defects in metal and alloy castings	Shrinkage cavities, hot tears, cold cracks, gas holes
Principles and methods used to produce steel forgings	Deformations, strengthening mechanisms, annealing
Principles of mechanical testing	Impact, tensile, hardness testing

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Non-destructive testing

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MEM30005A Calculate force systems within simple beam structures

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers understanding and calculating force systems within simple beam structures.

Application of the Unit

Application of the unit	This unit applies to solving simple engineering problems involving forces, moments and basic stress and strain calculations, and determining nominal sizes of simple beams subject to loading. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM30012A	Apply mathematical techniques in a manufacturing engineering or related environment

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine the resultant and equilibrant of systems of coplanar forces	1.1. Calculate the magnitude and direction of the resultant and equilibrant of coplanar force systems. 1.2. Calculate the line of action of a resultant using the principle of Moment.
2. Determine nominal sizes for a simple horizontal beam subject to a combination of uniform and point loading	2.1. Support reactions for a simply supported horizontal beam using the equations of equilibrium and including the moment effect of a couple are calculated. 2.2. The possible types of failure that need to be considered are determined. 2.3. Shear force and bending moment diagrams are drawn. 2.4. Bending stress is determined. 2.5. Calculations are completed to determine the nominal size for the beam. 2.6. Factors of safety are applied to finalise nominal size of beam.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- calculating and using trigonometry, transposition, algebraic formula
- drawing shear force and bending moment diagrams

Required knowledge

Look for evidence that confirms knowledge of:

- force and gravity
- the concept of force
- characteristics of force
- rectangular components of force
- graphical addition of forces
- mathematical addition of forces
- weight as force
- moment and torque
- moment of force
- addition of moments
- equilibrium of moments
- torque
- equivalent force moment systems
- statics
- equilibrium of coplanar forces
- conditions of equilibrium
- calculation of beam reactions (simply supported, point load, uniformly distributed load (UDL), self-weight)
- simple beams
- shear force and bending moment diagrams
- bending stress
- deflection by formulae
- stress and strain
- shear stress and strain
- allowable stress
- factors of safety

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to calculate force systems within simple beam structures. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with calculating force systems within simple structures, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30006A Calculate stresses in simple structures

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers determining stresses and their effect on the strength and stability of simple structures and mechanical components.

Application of the Unit

Application of the unit	This unit applies to the calculation of stresses in centrally loaded bolted connections, fillet and butt welded connections. All work is carried out under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM30012A	Apply mathematical techniques in a manufacturing engineering or related environment

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine stresses in simple structures and mechanical components	1.1. The shear stresses in simple bolted connections are determined. 1.2. The nominal weld size or length of weld required on simple welded connections is determined to meet load requirements. 1.3. Torque distribution diagrams are drawn and used to calculate torsional shear stress and angle of twist on threaded bolts subjected to torques.
2. Verify stress levels using appropriate reference material	2.1. Appropriate reference materials are used to verify that stress loading is acceptable and in accordance with standard operational procedures. 2.2. Verification results are reported according to standard operational procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- interpreting drawings and graphical representations
- calculating stresses using given formulas
- construction of torque distribution diagrams
- accessing relevant codes and reference material
- interpreting results against reference materials

Required knowledge

Look for evidence that confirms knowledge of:

- stress and strain:
  - normal stress and strain
  - modules of elasticity
  - deformation
  - Poisson's Ratio
  - shear stress and strain
  - modulus of rigidity
  - yield stress, ultimate stress, proportional limit, factor of safety, allowable stress
- centrally loaded connections
- bolted connections
- shear, tensile, torque and bearing stresses
- centrally loaded welded connections
- fillet and butt welds, method of failure
- size and length of weld
- effect of hole punching
- longitudinal stress
- how to access and use relevant codes and reference material

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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EVIDENCE GUIDE	
Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to calculate stresses in simple structures as defined. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with calculating stresses in simple structures, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Simple structures	Limited to consideration of centrally loaded bolted connections, fillet and butt welded connections
Reference materials	May include design manuals, handbooks, relevant codes and regulations, databases and manufacturers' references

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30007A Select common engineering materials

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers recognising common materials used in engineering, assisting in the selection of a material for a specific application, and using test results to evaluate the properties of materials.

Application of the Unit

Application of the unit	This unit applies to technician level activities in manufacturing and engineering environments. Work is carried out under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify common engineering materials by their principal properties	1.1. The principal properties of ferrous and non-ferrous metals are identified. 1.2. The principal properties of thermosetting and thermoplastic polymers are identified. 1.3. The principal properties of ceramics and composite materials are identified. 1.4. The effects of different types of bonding in materials are identified. 1.5. The effects of mechanical and thermal processes on the principal properties of materials are identified.
2. Select materials for specific applications	2.1. The engineering requirement for the specific application is determined in consultation with others. 2.2. Material is selected based on the requirement and consideration of principal properties and further processing. 2.3. Selection is confirmed according to standard operating procedures.
3. Verify selected material as fit for purpose	3.1. Appropriate tests for the required properties are identified. 3.2. Testing of materials is arranged with appropriate persons, if necessary. 3.3. Test results are analysed and material choices are

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ELEMENT	PERFORMANCE CRITERIA
	confirmed or modified as appropriate.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • undertaking research • selecting/carrying out tests appropriate to the material • communicating • documenting • planning and sequencing operations • reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
Required knowledge

Look for evidence that confirms knowledge of:
• classification of materials:
  • metals and non-metals
  • ferrous and non-ferrous metals
  • polymers (thermoplastics, thermosetting and elastomers)
  • ceramics
  • composite materials
• structure of materials
• physical properties of materials:
  • electrical conductivity/resistivity
  • specific gravity/density
  • thermal conductivity/expansion
  • specific heat
  • melting/boiling points
• magnetic properties
• optical properties
• mechanical properties:

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REQUIRED SKILLS AND KNOWLEDGE

- strength - yield, tensile, compressive
- stress/strain data
- hardness
- toughness (impact and slow strain)
- elasticity
- plasticity
- ductility
- malleability
- fatigue
- creep

- chemical properties:
  - corrosion of metals, corrosion processes, mechanisms
  - degradation of polymers
- materials testing methods - destructive testing and applications:
  - tensile
  - compressive
  - shear
  - torsion
  - hardness
  - impact
  - fatigue
  - creep
  - visual
  - corrosion testing
- engineering materials
- engineering applications of ferrous metals:
  - cast irons
  - carbon and alloy steels
  - stainless steels
- engineering applications of non-ferrous metals:
  - aluminium and its alloys
  - copper, brass and bronze
  - nickel alloys, zinc, titanium
  - magnesium
  - refractory metals
- engineering applications of polymers:
  - thermosetting polymers
  - thermoplastic polymers

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REQUIRED SKILLS AND KNOWLEDGE

• ceramics and glasses
• effects of mechanical and thermal processes on the properties of materials:
  • casting
  • forging, rolling and extrusion
  • cold forming
  • powder processes
  • heat treatment
  • joining - fasteners
  • soldering
  • brazing
  • welding
  • adhesives
  • finishing - coatings, metallic and non-metallic
• hazards and control measure associated with selecting common engineering materials, including housekeeping
• safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to select common engineering materials.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this

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EVIDENCE GUIDE	
	unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with selecting common engineering materials, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required and must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Common engineering materials	Includes ferrous metals, cast irons, carbon and alloy steels, stainless steels, coated steels, non-ferrous metals, aluminium and its alloys, copper and its alloys, nickel alloys, zinc, titanium, magnesium, refractory metals, polymers,

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RANGE STATEMENT	
	thermosetting polymers, thermoplastic polymers, ceramics and glasses
Appropriate tests	Tests which can be undertaken by a technician within the organisation as well as those required to be undertaken by external organisations, including simple tests
Required properties	Properties to be tested include tensile strength, compression, shear characteristics, torsion, hardness, impact resistance, fatigue resistance, creep resistance, visual appearance and colour, magnetic properties, corrosion resistance
Appropriate persons	Internal technicians and/or external organisations

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30008A Apply basic economic and ergonomic concepts to evaluate engineering applications

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers participating in the application of the basic concepts of economic and ergonomic principles and procedures to evaluate an engineering application prior to production.

Application of the Unit

Application of the unit	The work is carried out under supervision, usually in a team environment. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare required customer requirements from information provided	Criteria for the engineering application are obtained in accordance with standard operating procedures.
2. Verify that customer requirements have been met in the engineering application criteria	Criteria for the engineering application criteria are reviewed against customer requirement and deficiencies are noted. Knowledge of engineering parameters is applied to evaluate the engineering application criteria. Use of appropriate and relevant standards and codes is verified using standard operating procedures or reference to supervisor.
3. Verify specifications in accordance with economic principles	The relationships between quality, cost of production and function are considered and specifications are verified in accordance with policy and procedures.
4. Verify specifications in accordance with ergonomic principles	The specifications are checked and verified for health effects of human/machine interaction in accordance with given policy and procedures.
5. Seek approval of recommendations	All recommendations are referred to a supervisor for approval in accordance with policy and procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- determining customer requirements
- determining, accessing and using relevant Australian and ISO standards

Required knowledge

Look for evidence that confirms knowledge of:

- engineering parameters:
  - safety of personnel, consequences of failure (such as human injury)
  - quality of product consideration
  - material reliability and choice
  - safety factors
  - maintenance, source of spares/service
  - energy consumption
- economic considerations:
  - costs of manufacture, effect of production quantity
  - cost of quality
  - design for manufacture
  - use of standardised components
- ergonomic considerations:
  - safety considerations
  - human capacity - reach, dexterity, strength, human comfort
  - health effects of human/machine interaction, repetitive use injuries
  - aesthetics

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to participate in the application of basic economic, ergonomic concepts to evaluate engineering designs and applications.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying basic economic, ergonomic concepts to engineering designs and applications, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Engineering application	For this unit, engineering application includes assisting in engineering processes and applications requiring ergonomic and economic knowledge and skills including design, engineering assessments, supervision of installation and commissioning etc.
Engineering parameters	Includes consideration of safety of personnel, consequences of failure (human injury etc.), economic considerations, production cost, quality of product consideration, material reliability and choice, design safety factors, maintenance, energy consumption, source of spares/service
Standards and codes	Includes access and use of Australian standards (AS): AS 3000, AS 1250, AS 4800, AS 1100, International Standards Organisation (ISO) standards
Economic principles	Includes production quantities (mass/batch), cost of manufacture, ease of manufacture, use of standardised components, human capacity (reach, dexterity, strength, repetitiveness, human comfort), aesthetics, health effects of human/machine interaction, safety
Ergonomic principles	Includes designing, installing or checking things for effective human use, and creating environments that are suitable for human living

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RANGE STATEMENT	
	and work. It includes work methods, equipment, facilities, and tools that influence the worker's motivation, fatigue, likelihood of sustaining an occupational injury or illness, and productivity

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30009A Contribute to the design of basic mechanical systems

Modification History

Release 2 - Prerequisites updated - MEM30002A and MEM30003A merged and replaced in MEM05v8 by MEM30032A. Prerequisite outcomes remain equivalent.

Unit Descriptor

Unit descriptor	This unit covers contributing to basic mechanical system design, and selecting the components and mechanical features required to perform simple functions.

Application of the Unit

Application of the unit	This unit applies to all mechanical engineering environments. Work is carried out under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM16008A	Interact with computing technology
	MEM30032A	Produce basic engineering drawings

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Research equipment function and operational requirements	1.1. All relevant drawings, specifications, manuals and documentation are obtained in accordance with workplace procedures. 1.2. Appropriate personnel are consulted to determine requirements. 1.3. Information collected is interpreted and draft functional and operational requirements are prepared and verified with supervisor or design team.
2. Prepare a preliminary sketch/drawing/ specification	2.1. Appropriate components, assemblies and fasteners are selected to perform the required function. 2.2. Where required, components and/or materials are selected from supplier/manufacturer catalogues. 2.3. Appropriate and relevant codes are applied to the sketch/drawing/specification in accordance with workplace procedures. 2.4. The preliminary sketch/drawing/specification is referred to a higher authority for approval in accordance with policy and procedures.
3. Issue or file completed sketch/drawing/specificat	3.1. Approved sketch/drawing/specification is stored and catalogued in accordance with standard

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ELEMENT	PERFORMANCE CRITERIA
ion list as required	operating procedures. 3.2. Approved sketch/drawing/specification is issued in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading and interpreting specifications and drawings
Required knowledge

Look for evidence that confirms knowledge of:
• relevant codes and standards
• basic mechanical components:
  • shafts
  • bearings
  • seals
  • fasteners, thread systems
  • splines
  • cams
• drive components:
  • electric motors
  • IC engines
  • brakes
  • clutches
  • belts and pulleys
  • chains and sprockets
  • gears
  • couplings
  • universal joints
• lifting systems:

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REQUIRED SKILLS AND KNOWLEDGE
• lifting jacks • hoists • winch equipment • pneumatic systems: • advantages and disadvantages • compressors • pneumatic components • typical circuits and applications • electrical control • hydraulic systems: • advantages and disadvantages • power packs • pumps and other components • typical circuits and applications • electrical control • pumps and piping system: • purpose of pumps and piping systems • pumps, valves, pipes and other components • typical piping systems

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to contribute to the design of basic mechanical systems. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

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EVIDENCE GUIDE	
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with contributing to the design of basic mechanical systems, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and

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RANGE STATEMENT	
regional contexts) may also be included.	
Components, **assemblies and fasteners**	May include shafts, seals, bearings, fasteners, splines, cam, lifting systems, pneumatic circuits, hydraulic circuits, piping systems

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30010A Set up basic hydraulic circuits

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers setting up and selecting components associated with single linear hydraulic systems.

Application of the Unit

Application of the unit	This unit applies to all engineering or manufacturing environments. The unit refers to simple hydraulic circuits containing single linear actuators and motors. Work is carried out under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine system requirements	1.1. Instructions regarding system requirements are obtained, understood and clarified as necessary. 1.2. Circuit drawings using standard symbols are interpreted correctly.
2. Select components for simple hydraulic circuits	2.1. Suitable fluids are selected for given hydraulic systems from specification charts and in accordance with safety procedures involving fluids. 2.2. Linear actuators and motors are selected to suit system requirements. 2.3. Control valves are selected to suit system requirements.
3. Verify component selection	3.1. Circuits are set up and operated on laboratory benches. 3.2. Operation is analysed and outcomes are verified against system requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- interpreting simple hydraulic circuit drawings
- testing operation of simple hydraulic circuits
- assessing performance
- documenting circuit specifications and test results
- applying fluid power principles

Required knowledge

Look for evidence that confirms knowledge of:

- fluid power:
  - definition of the term fluid power
  - differences between pneumatic and hydraulic systems
  - advantages and disadvantages of fluid power compared with mechanical and electric power systems
  - safety procedures when working with fluid power equipment
  - basic properties of fluids
  - selection and suitability for different applications
  - basic properties and units - mass, volume, density, specific volume, relative density, force and weight, pressure (absolute, atmospheric and gauge), temperature (celsius and kelvin), viscosity, surface tension
  - introduction to temperature and pressure effects on the basic properties and applications
  - precautions to be taken when changing type of fluid in a system
- awareness of different components including:
  - pipes (rigid and flexible)
  - valves, types and functions
  - filters and strainers for liquids
  - gauges and instruments - pressure/temperature gauges, liquid level gauges, thermometers, thermocouples, manometers, piezometers
  - pipe fittings - elbows/bends, enlargement/contractions, coupler/unions, tees
  - tanks and vessels - storage tanks, pressure vessels, header and surge tanks, weirs/dams/reservoirs
  - flow measurement instruments - venturi and orifice meters
  - pumps, motors/turbines
- linear actuators:

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REQUIRED SKILLS AND KNOWLEDGE
• types, selection and functions • methods of supporting linear actuators • introduction to calculations related to linear actuators • recognition and drawing of standard symbols • observation and analysis of performance of linear actuators in laboratory circuits • control valves (hydraulic and pneumatic): • directional controls and functions • check valves and functions • pressure controls and functions • flow controls and functions • recognition and drawing of standard symbols for control valves • drawing and analysis of typical circuits containing control valves • observation and analysis of performance of valves in basic circuits • circuit design and analysis (single linear actuator): • drawing and analysis of circuit diagrams containing basic components • setting up and operating circuits on pneumatic and hydraulic benches in a fluid power laboratory

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to set up basic hydraulic circuits and verify outcomes.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the

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EVIDENCE GUIDE	
	job, i.e. the candidate is not in productive work, an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with setting up basic hydraulic circuits, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Simple hydraulic circuits	Limited to linear actuators, motors, control valves

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RANGE STATEMENT	
Safety procedures	Selecting a suitable fire resistant fluid for a system, given its operating conditions; following required precautions when changing a system from one fluid to another

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30011A Set up basic pneumatic circuits

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers setting up and selecting components associated with single linear pneumatic systems.

Application of the Unit

Application of the unit	This unit applies to all engineering or manufacturing environments. The unit refers to simple pneumatic circuits containing single linear actuators. Work is carried out under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine system requirements	1.1. Instructions regarding system requirements are obtained, understood and clarified as necessary. 1.2. Circuit drawings using standard symbols are interpreted correctly.
2. Select components for simple pneumatic circuits	2.1. Suitable air system components are selected for given fluid power systems from specification charts and in accordance with safety procedures involving compressed air. 2.2. Linear actuators are selected to suit system requirements. 2.3. Control valves are selected to suit system requirements.
3. Verify component selection	3.1. Circuits are set up and operated on laboratory benches. 3.2. Operation is analysed and outcomes are verified against system requirements.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- drawing pneumatic circuits
- testing operation of pneumatic circuits
- assessing performance
- calculating circuit requirements
- documenting circuit specifications and test results
- applying fluid power principles

Required knowledge

Look for evidence that confirms knowledge of:

- fluid power:
  - definition of the term fluid power
  - differences between pneumatic and hydraulic systems
  - advantages and disadvantages of fluid power when compared to mechanical and electric power systems
  - safety procedures when working with compressed air and associated equipment
- awareness of different components including:
  - air compressors
  - receivers, interlocks
  - pipes - rigid and flexible
  - valves - types and functions
  - filters - types and functions
  - gauges and instruments - pressure and temperature gauges, liquid level gauges, thermometers, thermocouples, manometers, piezometers
  - pipe fittings - elbows/bends
  - flow measurement instruments - venturi and orifice meters
  - air motors
  - linear actuators:
  - types, selection and functions
  - methods of supporting linear actuators
  - introduction to calculations related to linear actuators
  - recognition and drawing of standard symbols
  - observation and analysis of performance of linear actuators in laboratory circuits

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REQUIRED SKILLS AND KNOWLEDGE

• control valves (hydraulic and pneumatic):
  • directional controls and functions
  • check valves and functions
  • pressure controls and functions
  • flow controls and functions
  • recognition and drawing of standard symbols for control valves
  • drawing and analysis of typical circuits containing control valves
  • observation and analysis of performance of valves in basic circuits
• circuit design and analysis (single linear actuator):
  • drawing and analysis of circuit diagrams containing basic components
  • setting up and operating circuits on pneumatic and hydraulic benches in a fluid power laboratory

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to set up basic pneumatic circuits.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other

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EVIDENCE GUIDE	
	units addressing the safety, quality, communication, materials handling, recording and reporting associated with setting up basic pneumatic circuits or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifi-cations, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Safety procedures	Following required precautions when using compressed air and when shutting down air compressors and receivers

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30012A Apply mathematical techniques in a manufacturing engineering or related environment

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers applies the *concepts of mathematics* to appropriate and simple engineering situations within the individual's area of engineering expertise.

Application of the Unit

Application of the unit	This unit applies to technician level work that requires basic algebraic, trigonometric and statistical knowledge and skill. **Band**: **0** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Use concepts of arithmetic in the solution of engineering problems	1.1. Units of physical quantities are converted to facilitate engineering calculations. 1.2. Calculations are performed to solve problems involving rational and irrational numbers. 1.3. Scientific notation is used to represent numbers. 1.4. Calculations are checked for reasonableness using estimating and approximating techniques.
2. Solve engineering problems involving algebraic expressions with one independent variable	2.1. Algebraic expressions are manipulated using mathematical operations in their correct order.
3. Use two-dimensional geometry to solve practical problems	3.1. Angles expressed in degrees are correctly converted to radians and vice versa. 3.2. The perimeter, area, length and angles of a range of two-dimensional figures are correctly calculated. 3.3. The volume and surface area of complex figures are correctly calculated. 3.4. Points identified in terms of cartesian coordinates can be converted to polar coordinates and vice versa.
4. Use trigonometry to solve practical	4.1. Basic trigonometry functions are used to calculate the lengths of the sides of right-angled triangles.

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ELEMENT	PERFORMANCE CRITERIA
problems	4.2. Inverse trigonometry functions are used to determine angles in a right-angled triangle given the lengths of two sides. 4.3. The sine rule is used to determine the lengths of the sides of acute and obtuse angled triangles given one side and two angles. 4.4. The cosine rule is used to determine the lengths of the sides of acute and obtuse angled triangles given two sides and one angle.
5. Graph linear functions	5.1. Linear functions are solved graphically and equations of straight lines are determined from the slope and one point, or two points. 5.2. Two linear functions are solved simultaneously both algebraically and geometrically. 5.3. The length and mid point of a line segment are determined.
6. Solve quadratic equations	6.1. Quadratic equations are solved. 6.2. Simultaneous linear and quadratic equations are solved.
7. Perform basic statistical calculations	7.1. Mean, median and mode are calculated from given data. 7.2. Standard deviation is calculated and interpreted employing graphical representation.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

Look for evidence that confirms skills in:
• using and applying mathematical formulas:
  • logical thinking
  • problem solving
  • calculating
  • applying statistics

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REQUIRED SKILLS AND KNOWLEDGE
• using computer numerical methods • drawing graphs
Required knowledge
Look for evidence that confirms knowledge of: • transposing and evaluating formulae • polynomials • straight line coordinate geometry • introduction to indices • introduction to trigonometry • circular functions • trigonometry of oblique triangles • trigonometric identities • introduction to functions and their graphs

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply mathematical skills and knowledge to simple engineering applications. Evidence from tasks and projects should/may be used to complement and demonstrate integration of competency.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic

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EVIDENCE GUIDE	
	workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying mathematical concepts to engineering applications, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Concepts of mathematics	Include arithmetic, algebraic expressions with one independent variable, two-dimensional geometry, trigonometry, linear functions, basic quadratic functions, basic statistical methods

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RANGE STATEMENT	
Correct order	Refers to the correct procedure when expanding brackets, factorising algebraic expressions, factorising quadratic expressions, simplifying algebraic fractions, transposing formulae, solving simple one variable equations, finding the quotient and remainder given a linear division
Complex figures	May include cones, pyramids, spheres, frustums and intersections of figures singularly or in combination

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30013A Assist in the preparation of a basic workplace layout

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers assisting in the charting and analysis of basic manufacturing operations including assisting in the preparation of workplace layouts.

Application of the Unit

Application of the unit	The unit covers basic principles of ergonomics, productivity improvements and quality procedures and work flow analysis. Work is conducted under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify opportunities for workplace layout improvement	1.1. Basic analysis of workplace data is undertaken to determine sources of waste. 1.2. Future capacity requirement is obtained in accordance with policy and procedures. 1.3. Productivity improvement areas are established in accordance with organisational policy and procedures. 1.4. Appropriate productivity measures are established in conjunction with supervisors and other appropriate personnel.
2. Develop basic layout options for workplace improvement	2.1. Operation process charts, flow charts, flow process charts, and string diagrams etc. are used to develop basic layout options. 2.2. Information on ergonomics, health and safety hazards is considered in accordance with policy and procedures. 2.3. Improvements are developed in consultation with users and supervisors and in accordance with policy and procedures. 2.4. Simple economic appraisals for proposed improvements are developed in accordance with

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ELEMENT	PERFORMANCE CRITERIA
	policy and procedures. 2.5. Layout options are referred to a higher authority for approval in accordance with policy and procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • communicating • analysing • documenting • reviewing • applying principles of ergonomics • applying productivity principles
Required knowledge

Look for evidence that confirms knowledge of:
• basic knowledge of workplace layout principles including at a basic level the degree to which workplace layout is affected by:
  • engineering processes and systems
  • materials flow patterns
  • types of production plant and machinery
  • materials handling methods
  • unit loads
  • types of production methods
• productivity:
  • definition and measures of productivity
  • factors affecting productivity
  • productivity and quality
  • value adding
• recording techniques:
  • flow charts

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REQUIRED SKILLS AND KNOWLEDGE
• activity relationship charts • outline process charts • flow process charts • multipurpose charts • string diagrams • basic principle of ergonomics • the concept of waste and its application to productivity improvements

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to assist in the design of basic workplace layout.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with assisting in the design of basic workplace layout, or other units requiring the exercise of the skills and knowledge covered by this unit.

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EVIDENCE GUIDE	
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Waste	• Excess production and early production, waiting, materials queuing, not moving, people not working, transporting, double handling, poor process design, inventory, stores, buffers, lot sizes, inefficient performance of a process, reaching, bending, exertion • Making defective items, rework, rejects, unnecessary inspection
Information on ergonomics, **health and safety hazards**	• Standard references including NOHSC guidelines, any relevant Acts and Regulations, information contained in manufacturers' manuals, standard operating procedures • Workplace reports including:, incident reports, commissioned studies, advice from relevant leaders/supervisors/workplace committees

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30014A Apply basic just in time systems to the reduction of waste

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers reviewing and making continuous improvements to an existing Just in Time (JIT) production system in manufacturing.

Application of the Unit

Application of the unit	This unit applies to all types of manufacturing and engineering environments, most likely in a team setting. All work is carried out under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify potential to eliminate waste in the current system	1.1. Value chain members are identified. 1.2. Principles of waste elimination are applied to each step in the value chain. 1.3. Current storage/inventory in value chain is analysed for excesses. 1.4. Production lead time is analysed for all components, sub-assemblies and assemblies subject to JIT including potential for set up time reductions. 1.5. Kanban cards and flow authorisation indicators are analysed for appropriate quantity. 1.6. Workplace layout is analysed for flow and application of housekeeping principles. 1.7. Production process is analysed for excess rework and scrap.
2. Draft workable procedures to implement improvements to JIT system	2.1. Key internal stakeholders are liaised with to develop solutions to JIT issues. 2.2. Key external members of the value chain are liaised with to develop solutions to JIT issues. 2.3. Key measures for improvements are determined. 2.4. The plan is referred to a higher authority for approval in accordance with policy and procedures.
3. Implement the JIT	3.1. The JIT system/improvements are implemented

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ELEMENT	PERFORMANCE CRITERIA
system/improvements	according to workplace procedures. 3.2. Key measures of JIT are monitored. 3.3. Regular liaison is conducted with key stakeholders seeking areas for improvement.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • analysing • communicating • negotiating • reading/interpreting/following information on written job instructions, specifications, standard operating procedures and other applicable reference documents • planning and sequencing operations
Required knowledge
Look for evidence that confirms knowledge of: • JIT manufacturing philosophy • push and pull systems • Kanbans • work cells • set up time reduction techniques • group technology • ABC analysis of inventory • principles of TQM • principles of TPM • hazards and control measures associated with applying basic JIT systems to the reduction of waste • safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply basic JIT systems to the reduction of waste.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying basic JIT systems to the reduction of waste or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Value chain	Includes the entire production system, beginning with the customer, and includes the sales outlet, product design, processing and supply
Waste	• Includes activities and results to be eliminated within manufacturing • Categories of waste include excess production and early production, waiting, materials queuing, not moving, people not working, transporting, double handling, poor process design, inventory, stores, buffers, lot sizes, inefficient performance of a process, reaching, bending, exertion, making defective items, rework, rejects, unnecessary inspection
JIT	• Includes a production scheduling concept that calls for any item needed at a production operation - whether raw material, finished item, or anything in between, to be produced and available precisely when needed • JIT systems may also be known as part of other manufacturing systems such as lean manufacturing, agile manufacturing or similar
Kanban	• Includes a card or sheet used to authorise production or movement of an item • Kanban is typically applied to batch type operations and the production is measured in units produced. In continuous manufacturing

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RANGE STATEMENT	
	organisations, production is measured in terms of production rate
Flow authorisation indicator	May include Kanban bin, ticket or similar, or may be some other indicator of demand pull
Housekeeping principles	Principles of 5S which refer to the five Japanese words seiri, seiton, seison, seiketsu, shitsuke. These words are shorthand expressions for principles of maintaining an effective, efficient workplace: • seiri - eliminating everything not required for the work being performed • seiton - efficient placement and arrangement of equipment and material • seison - tidiness and cleanliness • seiketsu - ongoing, standardised, continually improving seiri, seiton, seison • shitsuke - discipline with leadership
Key measures	• May include inventory levels, lead time, delivery, productivity/ production rate, set up time, other measures of pull through the value chain, quality, rework, scrap rates • Pull system refers to a manufacturing planning system based on actual real-time needs from sales or equivalent - i.e. 'make what we sell'

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Engineering technician

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MEM30015A Develop recommendations for basic set up time improvements

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers participating in the development of improved set up procedures in manufacturing.

Application of the Unit

Application of the unit	This unit applies to all fields of manufacturing. Work is carried out under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify existing set up procedures	1.1. Internal and external set up activities are identified and recorded. 1.2. All waiting time is identified and recorded. 1.3. All adjustment times are identified and recorded. 1.4. Any hazards and risks from all steps in the set up are identified and recorded.
2. Analyse set up procedures to determine opportunities for improvement	2.1. Opportunities for conversion of internal set up activities to external set up are considered. 2.2. Opportunities to reduce/eliminate adjustment times, waiting times and any hazards and risks are considered.
3. Prepare recommendations for operational improvement	3.1. Liaise with relevant people to validate recommendations. 3.2. Recommended improvements are recorded.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • communicating, including preparing reports • analysing hazards • reading, interpreting and following information on written job instructions, specifications, standard operating procedures and other applicable reference documents
Required knowledge

Look for evidence that confirms knowledge of:
• principles of set up time reduction including:
  • internal and external set up activities
  • waiting time
  • adjustment times
  • set up hazards and risks
• planning and sequencing operations:
  • application of ergonomic principles and hierarchy of control in regard to hazards
  • hazards and control measures associated with developing recommendations for basic set up time improvements, including housekeeping
  • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to develop recommendations for basic set up time improvements.
Critical aspects for assessment and evidence required to demonstrate	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the

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EVIDENCE GUIDE	
competency in this unit	unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with developing recommendations for basic set up time improvements, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised

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RANGE STATEMENT	
wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Set up procedures	May refer to: • an exchange of dies/tools or a change between batches • any quantum equipment/process change to produce a different product
Internal and external set up activities	• Internal set up activities are those that can be done only when the machine or process is not actively engaged in production • External set up activities are those that can be done concurrently when the machine or process is actively engaged in production
Waiting time	Includes clean up activities, waiting for tools, waiting for materials, waiting for instructions, waiting for approvals, operator training etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Engineering technician

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MEM30016A Assist in the analysis of a supply chain

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers assisting in the analysis of value adding and non value adding activities within the supply chain.

Application of the Unit

Application of the unit	The unit applies to all fields of engineering and manufacture. The skills defined by this unit would normally be exercised under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Assist in mapping the supply stream for a nominated product/process	1.1. All organisations in the supply stream are identified. 1.2. All relevant steps in own organisation are identified.
2. Assist in assessing the value added at each step	2.1. Value added and contributed by each supplier organisation is identified. 2.2. Value added by each internal step is identified. 2.3. Activities which do not add value to customer benefit/features are identified. 2.4. External/internal supply chain members are liaised with to identify methods to reduce non value adding activities. 2.5. Information is collated and assessed. 2.6. Suggestions for improvements are recorded and submitted for approval.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • communicating • planning • assessing • problem solving • analysing • prioritising • reading and interpreting • recording
Required knowledge
Look for evidence that confirms knowledge of: • purpose of supply chain analysis • methods of supply chain analysis • types of waste, non value adding activities and methods of reducing them • process used to make own product • processes employed by other members of the supply chain sufficient to have meaningful dialogue with them • safe work practices

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to assist in the analysis of a supply chain.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency

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EVIDENCE GUIDE	
	in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with assisting in the analysis of a supply chain, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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RANGE STATEMENT	
situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Supply stream	Encompasses the entire supply system, beginning with the raw materials, processing and all tiers of the supply chain
Value added	Is measured against its contribution to the customer benefits/features and is determined in accordance with company definitions
Non value adding activities	Includes excess production and early production, delays, movement and transport, poor process design, inventory, inefficient performance of a process and making defective items

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30017A Use basic preventative maintenance techniques and tools

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers supporting the implementation of a preventative maintenance strategy for a manufacturing enterprise.

Application of the Unit

Application of the unit	This unit may apply to a range of predictive or proactive maintenance strategies within a manufacturing environment. The unit covers skills to enable participation across the most common preventative maintenance strategies and introduces the most common techniques and statistical tools. All work is undertaken under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Interpret enterprise maintenance strategy	1.1. Objectives and details of enterprise maintenance strategy are obtained in accordance with enterprise procedures. 1.2. Major techniques and tools for monitoring are confirmed in consultation with key stakeholders and supervisor.
2. Use preventative maintenance techniques and tools	2.1. Techniques and tools are selected and confirmed in consultation with key stakeholders and supervisor in accordance with enterprise requirements. 2.2. Key information and performance indicators required are identified in consultation with key stakeholders and supervisor. 2.3. Data collection is undertaken as required.
3. Interpret results	3.1. Actual information/performance indicators are compared with target levels set by supervisors and/or equipment manufacturers. 3.2. Required adjustments are developed in consultation with key stakeholders and supervisor.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- conducting root cause analysis
- identifying mean time between failures
- basic analysis of the effects of failures
- conducting condition monitoring
- analysing
- assessing
- communicating
- problem solving
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking for conformance to specifications
- checking and clarifying task-related information

Required knowledge

Look for evidence that confirms knowledge of:

- characteristics and strengths of different types of strategies
- characteristics and strengths of different types of techniques and tools
- principles of process equipment and how to improve its reliability
- resources required and how to obtain them
- hazard and control measures associated with using basic preventative maintenance techniques and tools, including housekeeping
- use and application of personal protective equipment
- safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to use basic preventative maintenance techniques and tools.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using basic preventative maintenance techniques and tools, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required and must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Strategies	May include total productive/preventive maintenance, reliability centred maintenance
Techniques and tools	Includes root cause analysis, mean time between failures, failure modes effects analysis, condition monitoring not involving application of trade skills

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30018A Undertake basic process planning

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers undertaking a basic determination of process specifications and production sequence for a manufacturing operation.

Application of the Unit

Application of the unit	This unit applies to a range of processes in manufacturing and to a stage of the overall production process. It does not apply to interfacing between processes. The process plan is developed over a specified timeframe taking into account resources available and required. The process plan establishes detailed steps required, and milestones against which progress can be checked. The plan is developed in accordance with accepted organisation practice and procedures. Performance of this unit would normally be conducted in a work environment where the basic process plan is reviewed by supervisors, planners or other internal review procedures before the plan is implemented. Where interfacing between manufacturing processes is required, Unit MEM30021A (Prepare a simple production schedule) should be selected. **Band**: **0** **Unit Weight**: **0**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Assist in determination of a process sequence	1.1. A basic analysis of process specifications using relevant job instructions, drawings, cost objectives, and operational procedures is undertaken. 1.2. An operation or process sheet is prepared based on analysis. 1.3. The process steps are clearly documented and approved in accordance with standard operating procedures.

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ELEMENT	PERFORMANCE CRITERIA
	1.4. Flow charts, based on analysis, are produced where required. 1.5. Material and parts lists are prepared, based on analysis, for the production process in accordance with standard operating procedures. 1.6. Tooling and/or equipment requirements are determined in conjunction with supervisor and other expert personnel. 1.7. All requirements are documented in accordance with standard operating procedures.
2. Prepare and submit new/revised operation sheet/flow chart/parts list as required	2.1. New/revised operation sheet/flow chart/parts list is prepared in accordance with standard operating procedures. 2.2. New/revised operation requirements are submitted in accordance with enterprise approval procedures.
3. Issue or file approved operation sheet/flow chart/parts list as required	3.1. Approved drawings and or parts lists are stored and catalogued or issued in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • communicating • prioritising • planning • drawing • evaluating • analysing • documenting • reading, interpreting and following information on written job instructions, specifications, standard operating procedures charts, lists, drawings and other applicable reference documents.

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REQUIRED SKILLS AND KNOWLEDGE
• planning and sequencing operations • checking and clarifying task-related information
Required knowledge

Look for evidence that confirms knowledge of:
• overview knowledge of product and process manufacturing principles including:
  • flow
  • elaborate transformation
  • value adding
  • waste
  • hazard identification and reduction
  • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to undertake basic process planning.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other

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EVIDENCE GUIDE	
	units addressing the safety, quality, communication, materials handling, recording and reporting associated with undertaking basic process planning, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Operation or process sheet	Includes operation sheets, sketches, tooling, equipment schedules and gauges etc.

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30019A Use resource planning software systems in manufacturing

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers accessing and using Enterprise Resource Planning (ERP), Materials Requirement or Resource Planning (MRP) software systems in conjunction with Just in Time techniques.

Application of the Unit

Application of the unit	This unit applies to resource planning software systems. Work is carried out under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM16008A	Interact with computing technology

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Use software interface	1.1. Keyboards, track ball/mouse and monitor and/or other peripherals are used to access system. 1.2. The system and the screens are navigated. 1.3. Messages are acknowledged. 1.4. Information is processed in the required format.
2. Access information	2.1. Relevant data and information is obtained from the system. 2.2. The status of items in the system is identified. 2.3. Historical data and information are accessed. 2.4. Information is interpreted and actions are prioritised.
3. Take appropriate actions	3.1. Actions are taken in response to resource planning information. 3.2. Follow-up is conducted as appropriate to ensure anticipated results have occurred. 3.3. Adjustments and variations are recorded according to procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- using basic computer functions
- analysing
- communicating
- undertaking production planning and control
- prioritising
- reading and interpreting
- recording

Required knowledge

Look for evidence that confirms knowledge of:

- technical knowledge and skills needed to operate process
- hierarchy of ERP, MRP or similar systems and operation
- information available from and business activities exercised by/through the ERP, MRP system
- closed loop manufacturing system basics
- business planning, demand, resources
- Master Production Scheduling (MPS)
- Materials Requirement Planning (MRP)
- Capacity Requirement Planning (CRP)
- system inputs:
  - bills of material
  - need for accuracy
  - inventory statistics
  - planning data
  - introduction to capacity management
  - production activity control
- system outputs:
  - planned orders
  - order action
  - firm/tentative
- Just in Time (JIT)
  - techniques
  - production smoothing

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REQUIRED SKILLS AND KNOWLEDGE
• single unit flow • Kanban • set up time reduction (SMED) • lead time reduction • production control methods: • types • master schedules • control by exception • computer control • visual control • combination MRP2/Kanban system • shop floor - day-to-day - Kanban • scheduling: • techniques • order release • policies • centralised • decentralised • inventory control: • raw • work-in-process • finished goods • lean manufacture and inventory • inventory costs • procurement • material control techniques • ABC (Pareto) Analysis • Economic Order Quantity (EOQ) • Min-Max systems • Kanban - Just in Time • cycle counting

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to use ERP, MRP planning software systems in manufacturing. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and to be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is, the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using ERP, MRP planning software systems in manufacturing, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and to be capable of applying the competency in new and different situations and contexts. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate will have access to all tools, equipment, materials and documentation required. The candidate will be permitted to refer to any relevant workplace procedures, product

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EVIDENCE GUIDE	
	and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
System	Includes ERP, MRP or similar software programs
Appropriate actions	Appropriate actions are actions in regard to production schedules, materials management, purchasing and ordering, transport and logistics that are needed as a result of information obtained from resource planning software
Resource planning information	May include information from ERP, MRP or similar systems that provide information on master production schedule, materials requirement plan, capacity requirement plan, bills of material, inventory control and statistics, order action, schedules

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30020A Develop and manage a plan for a simple manufacturing related project

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers developing and managing low risk manufacturing related projects that may be small scale and managed by one person and are carried out under guidance.

Application of the Unit

Application of the unit	This unit applies to technical work in all environments. Work is carried out under supervision. If skills in development of production schedule are required, then Unit MEM30021A (Prepare a simple production schedule) should be selected. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Select appropriate project management tools and develop project plan	1.1. A working knowledge of project management tools is used to develop a plan for a simple manufacturing related project and schedule of activities to meet project outcomes. 1.2. The plan is referred to a supervisor for approval in accordance with policy and procedures.
2. Implement planned activities	2.1. Plan is implemented according to schedule. 2.2. All affected personnel are communicated with regarding project implementation. 2.3. Supply and/or allocation of required resources including materials and equipment is organised. 2.4. Project progress is regularly reported in relation to agreed milestones to provide a measure of performance throughout the life of the plan. 2.5. Progress is discussed in consultation with other staff and contractors to ensure effective outcomes.
3. Review project plan and schedule	3.1. Project outcomes, performance standards and project objectives are monitored and analysed against specifications and the results are reported in

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ELEMENT	PERFORMANCE CRITERIA
	accordance with procedures. 3.2. Variations in keeping to plan are discussed with supervisors and are resolved in accordance with enterprise policy and procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • using computing skills • using interpersonal communication skills • negotiating • report writing • reading, interpreting and following information on written job instructions, specifications, standard operating procedures and other applicable reference documents • planning and sequencing operations • checking and clarifying task-related information
Required knowledge
Look for evidence that confirms knowledge of: • understanding of applicable regulations and standards • appropriate software • Gantt charts • critical path method (CPM) • bar charts • work breakdown structures • program evaluation and review technique (PERT) • basic quality assurance techniques • knowledge of availability of resources • safe work practices and procedures • a basic knowledge of: • the project life cycle and the relationship between project phases

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REQUIRED SKILLS AND KNOWLEDGE
• planning and control procedures, resource management and risk management

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to develop and manage a plan for a simple manufacturing related project.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with developing and manage a plan for a simple manufacturing related project or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond

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EVIDENCE GUIDE	
	those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Project management tools	May include critical path method (CPM), bar and Gantt charts, work breakdown structures, Program Evaluation and Review Technique (PERT), project management software packages, recording systems - electronic and manual
Plan	May include project implementation plans, quality assurance targets, milestones, any planning that relates to time, cost or quality and requires that progress is communicated to others
Simple manufacturing related project	Projects that are small scale, low risk, managed by one person, carried out under guidance, related to manufacturing processes and products

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30021A Prepare a simple production schedule

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing a simple production schedule in manufacturing. For skills associated with determining steps in manufacturing process see Unit MEM30018A (Undertake basic process planning).

Application of the Unit

Application of the unit	This unit applies to all manufacturing and engineering workplace environments. It covers the scheduling of production that involves several interconnected manufacturing processes. All work is carried out under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify production requirements	1.1. The production processes to be used are identified from instructions and specifications provided. 1.2. Customer requirements in terms of volume, delivery time and arrangements and quality are obtained from supervisor or other appropriate sources. 1.3. Customer and process requirements are analysed to determine production requirements.
2. Develop an activity plan production requirements	2.1. Production requirements are divided into activity elements. 2.2. A network diagram is constructed. 2.3. The critical path is determined. 2.4. The latest start/earliest finish and slack time are determined for activity elements to meet requirements. 2.5. Assistance and approval from supervisor is obtained.
3. Prepare the production schedule	3.1. A production schedule is prepared which lists: 3.1.1. customer requirements 3.1.2. time constraints 3.1.3. production requirements

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ELEMENT	PERFORMANCE CRITERIA
	3.1.4. machine availability and capability 3.1.5. inventory requirements 3.1.6. procurements 3.1.7. supply capacities 3.1.8. contingency analysis. 3.2. A simple bill of materials required is prepared to assist in control of materials. 3.3. Schedule is depicted using a Gantt chart or similar graphical display. 3.4. Schedule allows for future changes to improve performance. 3.5. Assistance and approval from supervisor is obtained.
4. File and issue the schedule	4.1. The schedule is reviewed and tested with appropriate personnel. 4.2. The schedule is referred to appropriate personnel for implementation. 4.3. All supporting documents are provided for implementation. 4.4. The schedule is filed/issued according to workplace procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • prioritising • communicating • managing time • organising • documenting • using project management tools • analysing • calculating

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REQUIRED SKILLS AND KNOWLEDGE
• reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • planning and sequencing operations • checking and clarifying task-related information
Required knowledge

Look for evidence that confirms knowledge of:
• basic knowledge of:
  • types of production
  • jobbing production
  • batch production
  • process production
  • Just in Time procedures
  • cellular manufacture
  • scheduling
  • interpreting customer requirements
  • machine capability and selection
  • Gant charts
  • contingency plans
  • introduction to project planning techniques
  • introduction to PERT/CPM diagrams
  • introduction to critical path networks
• hazards and control measures associated with preparing a simple production schedule, including housekeeping
• safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare a simple production schedule.

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and to be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with preparing a simple production schedule, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Simple production schedule	• Applies to the preparation of a schedule for the manufacture of a single component or single assembly function; or to operations for a single small production work unit or production cell • The schedule will involve only a small number of constraints or variables

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30022A Undertake supervised procurement activities

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers planning and executing standard procurement activities to achieve required outcomes under the direction and guidance of an experienced procurement officer.

Application of the Unit

Application of the unit	Work is carried out under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan procurement activities	1.1. The procurement requirements and outcomes are interpreted, understood and, where necessary, clarified. 1.2. Instructions for procedures to manage standard contract in accordance with legislation, policy and procedures are obtained. 1.3. Supplier is selected in accordance with workplace procedures.
2. Establish contractual arrangements	2.1. Method of requesting and receiving offers is in accordance with organisational policy and procedures. 2.2. Evaluation and selection of offer is made in consultation and in accordance with policy and procedures. 2.3. Contractual arrangements are submitted for approval and formalised in accordance with policy and procedures. 2.4. Notification of successful and unsuccessful suppliers occurs in accordance with organisational policy and procedures.
3. Follow up on contracts	3.1. Start-up or transition arrangements are confirmed and monitored in accordance with policy and procedures. 3.2. Communication strategies are implemented to ensure effective relationship with contractor/s is managed in accordance with policy and procedures. 3.3. Contractual obligations to contractors are met in accordance with policy and procedures.

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ELEMENT	PERFORMANCE CRITERIA
	3.4. Contractor performance is monitored to ensure contractual obligations are being met. 3.5. Approvals are obtained for any contract variations in accordance with organisational and contractual requirements. 3.6. Disputes/complaints procedures are followed and implemented in accordance with contractual requirements. 3.7. Records are maintained in accordance with organisational and legal requirements to provide an audit trail and for other organisational purposes.
4. Complete contractual arrangements	4.1. Goods or services received are verified as meeting outcomes required. 4.2. Contracts are finalised, cancelled or terminated in accordance with organisational and contractual requirements. 4.3. Records are maintained in accordance with organisational requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • planning and evaluating • using numeracy skills for developing and using a budget and contractual timeframes • effectively consulting and negotiating with suppliers involving oral and written exchanges • using writing skills for procurement specification in unambiguous terms • reading contractual agreements which may include complexity of language and style • undertaking ongoing communication with contractor which may involve explanation or clarification of written and oral information; note-taking at meetings; active listening; checking for understanding and recording • using numeracy skills for scheduling activities, and planning activities and

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REQUIRED SKILLS AND KNOWLEDGE
timeframes
Required knowledge
Look for evidence that confirms knowledge of: • applicable Commonwealth/State/Territory government legislation • procurement policies and practices • method of requesting and receiving offers • procurement approval procedures • evaluation and selection of offer • procedures to manage the contract in accordance with legislation, policy and procedures • procedures for receipt and payment of goods or services

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to undertake supervised procurement activities.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other

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EVIDENCE GUIDE	
	units addressing the safety, quality, communication, materials handling, recording and reporting associated with undertaking supervised procurement activities, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Standard contract	Covers contracts where deliverables and conditions desired from the supplier have already been determined by the company and where there are pre-existing procedures for requesting and receiving offers
Method of requesting and receiving offers	May include request for quotation, request for offer, direct purchases using existing supply agreements such as standing offers, common use arrangements, oral quotations, written quotations,

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RANGE STATEMENT	
	direct purchase from retail or wholesale outlets, electronic commerce
Evaluation	May include price comparison, timing, suitability
Contractual arrangements	May include verbal and written orders, purchase order, credit card, petty cash, memoranda of understanding/ memoranda of agreement, in-house service level agreements, contracts, common use arrangements/ standing offers
Records	May include purchase requests and orders, invoices and payment requests, statements and petty cash vouchers, offer and contract documents, evaluation process documentation, records of authorised officers' decisions, records of supplier performance

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30023A Prepare a simple cost estimate for a manufactured product

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers applying basic principles and concepts associated with the preparation of a cost estimate for a product.

Application of the Unit

Application of the unit	This unit applies to all manufacturing and engineering workplace environments. Work is carried out under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Obtain tender/cost estimate requirements	1.1. Tender/cost estimate brief is obtained within established organisational framework, procedures and routines. 1.2. Key requirements are identified. 1.3. Assistance/approval from supervisor is obtained.
2. Prepare a simple cost estimate	2.1. Relevant costing data is identified and interpreted from the tender/cost estimate documents. 2.2. Organisational production costs are obtained. 2.3. Cost estimates are prepared according to established organisational framework, procedures and routines. 2.4. Assistance/approval from supervisor is obtained.
3. Verify cost estimate	3.1. Actual cost information is sourced from a completed tender/cost estimate project. 3.2. Actual costs are compared with estimated cost to identify deviations. 3.3. A report is prepared for supervisors to explain deviations according to established organisational framework, procedures and routines. 3.4. Assistance/approval from supervisor is obtained.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures and other applicable reference documents
- undertaking simple report writing
- planning and sequencing operations
- checking and clarifying task-related information

Required knowledge

Look for evidence that confirms knowledge of:

- overview of the impact on cost estimates of:
  - product manufacture
  - demand vs. capability
  - make-or-buy
  - market-demand-price-competition
  - cost control
  - product costs
  - materials
  - resource consumption (water, power, etc.)
  - labour
  - standard time/usage
  - margins, profit/loss
  - using proforma estimate sheets
  - using estimates as targets
  - impact of value adding non value adding activities
- lead times associated with:
  - raw material availability
  - equipment, tool design and commissioning
  - prototypes and trial builds
  - estimating processes
  - use of contract documents - drawings, specifications
  - consideration of general conditions and any special conditions

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REQUIRED SKILLS AND KNOWLEDGE
• application of resources costs - hourly rates (labour, plant, material, subcontractors) • contingency costs • allowance for contract variations • hazards and control measures associated with preparing a simple cost estimate for a manufactured product, including allowing for housekeeping, safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare a simple cost estimate for a manufactured product.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with preparing a simple cost estimate for a manufactured product, or other units requiring the exercise of the skills and knowledge covered by this unit.

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EVIDENCE GUIDE	
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Simple cost estimate	• Based on known production and material costs • Cost can be estimated using a limited number of variables • Estimate relates to a discrete product with a limited number of operations for manufacture
Tender/cost estimate brief	May include project guidelines and instructions, internal or external requirements, information from tender/contract documents, drawing specifications
Key requirements	May include timing, budget, resources, output, special conditions
Deviations	Reported as fractions or percentages, does not

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RANGE STATEMENT	
	include standard deviations, six sigma etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30024A Participate in quality assurance techniques

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers participating in quality improvement programs at a basic level.

Application of the Unit

Application of the unit	This unit applies to all fields of engineering. Skills are applied to working in teams and work is carried out under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM15001B	Perform basic statistical quality control

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Interpret and apply quality standards and procedures	1.1. Quality standards and procedures are interpreted and applied to individual and teamwork in accordance with standard operating procedures.
2. Monitor and report on quality	2.1. Quality of all received, in-work and finished materials and products is monitored as required in accordance with standard operating procedures. 2.2. Designated process improvement tools are used either individually or in a team to identify and solve design, development and production quality problems. 2.3. Designated analytical tools are used to evaluate principal causes of process variation in consultation with the team or other subject experts. 2.4. Further action to improve quality is recommended, where required, using standard operating procedures.
3. Assist in implementing approved improvement strategy or strategies	3.1. Key indicators and performance measures are established and agreed in consultation with the team or other subject experts. 3.2. Process, product output is measured against key indicators in consultation with the team or other subject experts. 3.3. Steps are taken to lock in improvements in accordance with standard operating procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- undertaking problem solving
- undertaking basic arithmetic calculations
- interpreting known data
- using standard texts and references
- undertaking simple report writing
- reading and interpreting engineering specifications

Required knowledge

Look for evidence that confirms knowledge of:

- the importance of quality
- the key principles of quality improvement programs
- the influence of variation
- use and application of Australian standards/ ISO 9000 etc.
- quality policy
- quality manuals
- quality procedures
- quality definitions
- purpose of quality audits
- simple sampling techniques and possible sources of sampling error and bias
- simple statistical tools
- problem solving techniques including:
  - process flow charts, interpretation and construction of simple case
  - cause and effect diagrams, fault trees etc.
  - root cause analysis
  - Pareto diagrams

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to participate in quality assurance techniques - basic. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with participating in quality assurance techniques - basic, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Quality standards and procedures	Includes quality programs such as TQC, six sigma etc., quality policy, quality manuals, ISO 9000 and associated quality standards
Process improvement tools	Includes process flow charts, cause and effect diagrams, brainstorming sessions, Pareto diagrams, check sheets, run chart, scatter diagrams etc.
Analytical tools	Can include statistical analysis, critical incident analysis, root cause analysis etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30025A Analyse a simple electrical system circuit

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers analysing a simple circuit by identifying the function and operation of the circuit and circuit components contained within approved manufactured products.

Application of the Unit

Application of the unit	This unit applies to all manufacturing environments. It covers analysis of existing circuits against specifications only and does not extend to determining modifications to circuits. This unit does not cover the skills involved in direct measuring of values requiring connecting or disconnecting of circuits and components covered by licensing requirements. Where such values are required they are to be obtained through the assistance of appropriately licensed personnel or through undertaking the specified training for the appropriate licence. Work is conducted in accordance with regulatory and legislative requirements in each State and Territory Work is carried out under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Refer to Application of the Unit

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Pre-Requisites

Prerequisite units		
Path 1	MEM12024A	Perform computations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Establish function and purpose of selected circuit	1.1. All relevant drawings, specifications, manuals and documentation are obtained and interpreted in accordance with workplace procedures. 1.2. Circuit and component installation is observed where required to establish function and purpose. 1.3. Safety procedures to be followed are determined in conjunction with supervisors and in accordance with legislative and regulatory requirements. 1.4. Appropriate personnel are consulted with to establish job requirements.
2. Extract a circuit diagram from	2.1. Appropriate components and assemblies are identified.

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ELEMENT	PERFORMANCE CRITERIA
existing drawings and documentation	2.2. Where required, components and/or materials are identified from supplier/manufacturer catalogues. 2.3. Circuit diagram is extracted. 2.4. Drawing conventions and symbols are used in the diagram in accordance with codes and workplace procedures.
3. Analyse the circuit for electrical characteristics	3.1. Functions of the circuit and components are compared against design characteristics and operational specifications.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- calculating
- reading and interpreting specifications and drawings
- drawing to scale
- analysing
- planning and sequencing operations
- checking and clarifying task-related information
- checking for conformance to specifications

Required knowledge

Look for evidence that confirms knowledge of:

- safe work practices and procedures
- hazard and control measures associated with analysing the function of a simple electrical system circuit
- dangers and safety precautions:
  - electrical hazards
  - earthing and insulation
- The function of the following components:
- resistors:
  - fixed (composition and wire wound)

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REQUIRED SKILLS AND KNOWLEDGE

- variable (rheostats, potentiometers and trimmers)
- non-linear (thermistors)

- capacitors:
  - fixed (ceramic, plastic and electrolytic)
  - variable
  - magnetic
  - transformers (AF, RF and power)
  - chokes
  - relays
  - contactors
  - rectifiers
  - smoothing filters
  - voltage regulators and feedback
- basic physics:
  - conductors
  - insulators
  - semiconductors
  - current flow
  - voltage
  - resistance
  - colour code
  - power rating
  - Ohm's Law
  - electrical units
  - power in electrical circuits
- protection methods:
  - fuses
  - circuit breaking
  - safety interlocks
  - earthing - personnel safety
- a.c. circuits:
  - series and parallel a.c. circuits
  - power in a.c. circuits
- power supplies:
  - transformers
  - rectifiers
  - smoothing filters
  - voltage regulators and feedback

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REQUIRED SKILLS AND KNOWLEDGE
• function and operation of a simple low voltage d.c. power supply • function and operation of the transformer in a simple low voltage d.c. power supply, including the significance of the turns ratio • function in a simple low voltage d.c. power supply of rectifiers including the significance of the diode characteristics, for both half and full wave types • operation of smoothing filters in a simple low voltage d.c. power supply • operation of simple zener diode type voltage regulators in a simple low voltage d.c. power supply • feedback

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to analyse the functions and components of a simple electrical system circuit. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication,

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EVIDENCE GUIDE	
	materials handling, recording and reporting associated with analysing a simple electrical system circuit or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Components and assemblies	Can include: • resistors - fixed (composition and wire wound), variable (rheostats, potentiometers and trimmers), non-linear (thermistors) • capacitors - fixed (ceramic, plastic and electrolytic), variable, magnetic, transformers (AF, RF and power), chokes, relays, contactors, rectifiers, smoothing filters, voltage regulators and feedback

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30027A Prepare basic programs for programmable logic controllers

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers writing, testing, editing and monitoring programs using a hand program loader.

Application of the Unit

Application of the unit	This unit applies to all fields of engineering and manufacturing. Work is done under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Write and test basic programs using a hand program loader	1.1. Programs are written in accordance with programming rules. 1.2. Programs are loaded into a PLC. 1.3. Programs are verified with a supervisor. 1.4. The operation of programs is tested with assistance from a supervisor.
2. Edit and monitor basic programs using a hand program loader	2.1. The monitoring function is used to verify circuit conditions and check the current values of timers and counters. 2.2. Editing features are used to make minor program changes.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE
Look for evidence that confirms skills in: • communicating • planning • assessing • problem solving • analysing • reading and interpreting engineering specifications, standard operating procedures and other applicable reference documents • organising information • using numeral operations, geometry and calculations/formulae within the scope of this unit • checking for conformance to specifications • planning and sequencing operations • checking and clarifying task-related information
Required knowledge
Look for evidence that confirms knowledge of: • hazards and control measures associated with preparing basic programs for PLC, including housekeeping • safe work practices and procedures • General knowledge of programmable controllers including: • basic PLC operation: definitions, terminology and block diagrams; scan cycle • basic programming rules; addressing for I/O; halt; run • programming (using a hand programmer): flowcharts/steps to use when programming; clearing of memory; ladder format • Boolean/mnemonic/statement list format; series circuits; parallel circuits; latching circuits; stack register operation; combination series/parallel circuits; inversion elements; timers • counters; monitoring of discrete I/O and timer/counter values; edit (insert and delete elements) • connection of discrete input and output devices to a PLC

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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EVIDENCE GUIDE	
Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare basic programs for programmable logic controllers.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with preparing basic programs for programmable logic controllers, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Programs	Includes series elements, parallel elements, combination series parallel elements, basic timers and counters

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30028A Assist in sales of technical products/systems

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers assisting to identify opportunities for the sale of technical products/systems and providing technical product information to internal and external clients.

Application of the Unit

Application of the unit	This unit applies to all fields of engineering and manufacturing. Work is done under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Develop product knowledge in a nominated area	1.1. Product purpose/s and use/s are identified 1.2. Key features of the product are identified. 1.3. Product features are identified. 1.4. The strengths and weaknesses of competitors' products are established from available sources.
2. Assist in identification of sales prospects	2.1. Assist in identification of potential clients from available sources in accordance with company procedures 2.2. Assist in targeting present, previous and new clients through nominated prospecting methods as required.
3. Apply product knowledge to client requirements	3.1. Assist in the development and presentation of product/system promotional information. 3.2. Provide information on the technical product/process to meet the client's requirements.
4. Assist in closing the sale	4.1. Conditions of the agreement are negotiated. 4.2. Process and completion of the sales transaction comply with organisational requirements.
5. Assist in providing after sales service	5.1. Assist in matching client's need and identifying opportunities for improvement/s. 5.2. Assist in training clients in applying technical products.

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ELEMENT	PERFORMANCE CRITERIA
	5.3. Review and report on client's feedback.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- communicating
- literacy skills to interpret legal requirements, product labelling and description and organisational requirements
- sales data interpretation skills
- information management skills, including the ability to summarise information verbally and non-verbally
- ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
- use of internet and other technology to locate prospect information
- interpretation of numerical data associated with prospects
- use of technology to store and manage prospect information
- ability to apply analytical skills in relating products to prospects' requirements
- negotiation skills

Required knowledge

Look for evidence that confirms knowledge of:

- basic product knowledge in a specific nominated area
- buying and selling processes
- organisational requirements, including policy and procedures
- key competitors and their products
- industry trends and developments
- legislative and regulatory requirements relevant to the product/s in regard to occupational health and safety and environmental issues
- range of prospecting methods, and prospect information management strategies
- prospecting as a key component of the overall sales process
- familiarity with range of buyer motives
- sales closure techniques, and situations in which it is appropriate to attempt closure
- safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to assist in sales of technical products/systems.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with assisting in sales of technical products/systems, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes,

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EVIDENCE GUIDE	
	standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Nominated area	A range of products within a particular industry which has been nominated by the employer and employee
Features	The capability elements, including strengths and weaknesses of the product to deliver benefits to potential buyers
Available sources	Other company personnel, catalogues, trade association magazines, trade shows, competitors' sales literature, competitor websites, internal sales and data records
Prospecting methods	• Prospecting is defined here as A continuous process of gathering the names of potential buyers who are likely to be interested in purchasing the salesperson's product • Prospecting methods may include referrals, networking, personal observation, intra-organisational leads, spotters, cold canvassing, direct mail, media advertising, telemarketing, journals, magazines, newspapers
Conditions	Price, delivery, payment options, client loyalty and length of contract. warranty

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements

Modification History

Release 1 - New unit of competency

Unit Descriptor

This unit of competency covers the skills and knowledge required to apply functions of computer-aided design (CAD) software programs that are typically used in the production of detail drawings.

Application of the Unit

This unit is suitable for those working within a CAD or drafting work environment and may be applied across engineering and manufacturing environments. It covers competent use of a CAD program to perform basic drawing tasks used in the development of detail drawings. Drawings may include plans, diagrams, charts, circuits, systems or schematics.

This unit includes using computer equipment and selecting software functions in order to generate basic drawing elements.

Work is conducted under supervision.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of

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performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Confirm drawing requirements	1.1	Confirm purpose, scope, and information and presentation requirements for drawing
		1.2	Review available information relevant to project and work requirements, and identify and address further information needs
		1.3	Identify computing equipment and software used in the organisation
		1.4	Identify work flow and procedures for work supervision
		1.5	Examine requirements for presentation of drawings
2	Identify key features of CAD software	2.1	Describe types of CAD software used for detail drafting, their key features and suitability for producing specific drawing outcomes
		2.2	Describe types of CAD software used for design drafting, their key features and suitability for producing specific drawing outcomes
		2.3	Identify differences in CAD process to generate 2-D drawings and 3-D models, and reasons for each presentation
		2.4	Identify differences in CAD process to generate single and multiple view drawings, and reasons for each presentation
		2.5	Identify CAD software used in the organisation and confirm compatibility with other software programs and peripheral equipment
		2.6	Identify software features for linked specifications, catalogues or materials ordering
3	Access software and set up for	3.1	Open software and navigate organisational filing and library system

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	drawing work	3.2	Identify organisational and software templates and determine uses
		3.3	Identify organisational symbols, codes and standards to be applied in drafting work and how these are accessed and applied
		3.4	Apply workplace procedures to retrieve and manipulate required information and navigate computing technology
		3.5	Set up working environment
4	Produce basic drawing elements	4.1	Use CAD functions to produce basic drawing elements
		4.2	Use editing and transfer tools and methods to modify drawing elements
		4.3	Apply dimensions, text and symbols to drawing elements
		4.4	Import and export files into/out of working space
		4.5	Generate different views and perspectives
		4.6	Organise presentation of work
5	Complete CAD operations	5.1	Save and file drawing elements according to organisational procedures
		5.2	Print drawing elements and evaluate presentation
		5.3	Evaluate work and identify areas for improvement
		5.4	Close applications, perform CAD housekeeping and maintain organisational filing system

Required Skills and Knowledge

Required skills

Required skills include:

- literacy skills sufficient to read instructions for drawings work

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- using computer technologies and navigating software
- numeracy skills sufficient to interpret technical information and determine scaling and layout issues
- navigating software to:
  - manipulate drawing entities
  - modify dimension styles
  - create and use layers
  - manipulate the drawing origin
  - define and utilise symbol libraries
  - utilise grids/grid snaps and object snaps
  - display views at multiple scales
  - add title blocks/frame to layout a drawing for printing
  - prepare advanced drawings in plane orthogonal or equivalent
  - set up prototype drawings
  - define and extract attribute data
  - create bills of materials (BOM) utilising attribute data and third-party application software

Required knowledge

Required knowledge includes:

- general knowledge of different approaches to drawing
- awareness of copyright and intellectual property issues and legislation in relation to drawing
- environmental and occupational health and safety (OHS) issues associated with the tools and materials used for drawing
- quality assurance procedures
- CAD program capabilities and processes

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria required skills and knowledge range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to use CAD software to produce graphics commonly used in drafting work.
Critical aspects for assessment and evidence required to demonstrate competency in this	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required

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unit	knowledge, and be capable of applying the competency in new and different situations and contexts. Specifically the candidate must be able to: • work within typical site/teamwork structures and methods • apply worksite communication procedures • comply with organisational policies and procedures, including quality requirements • participate in work meetings • comply with quality requirements • use industry terminology • apply appropriate safety procedures • identify drawing work requirements and determine appropriate software functions and features • identify features and uses of CAD software used in detail and design drafting • access and use computing equipment and CAD software functions to produce drawing elements.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with drafting or other units requiring the exercise of the skills and knowledge covered by this unit.

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Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways, including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Range Statement

CAD software	CAD software may include: • AutoCAD • Inventor • Revitt • Solidworks • ProSteel • XSteel • other programs
Key features	Key features may include: • 2-D • 3-D modelling • built-in specifications • file import/export • save • undo • scale
Specific drawing outcomes	Specific drawing outcomes may include • 2-D • 3-D modelling • drawings for specific engineering applications • orthographic/isometric/perspectives/schematics
Basic drawing elements	Basic drawing elements may include: • points, line angles, circles, arcs, planes, figures

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	and solids • squares, rectangles and triangles • bisected lines and dividing lines • polygon, ellipse, spline, dimension and hatch
Editing and transfer tools and methods	Editing and transfer tools and methods may include: • delete, fillet, chamfer, erase, trim/extend, break, undo and redo commands • zooming and panning • moving, copying, rotating and mirroring • polar and rectangular duplication • object snaps • dimensions • selecting entities • dividing • scaling • measuring • grouping

Unit Sector(s)

Drawing, drafting and design

Custom Content Section

Not applicable.

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MEM30032A Produce basic engineering drawings

Modification History

Release 1 - New unit of competency

Unit Descriptor

This unit of competency covers producing drawings or similar graphical representations where the critical dimensions and associated tolerances and design specifications are predetermined.

Application of the Unit

This unit applies to any of the full range of engineering disciplines. All work is carried out under supervision and all specifications, dimensions and tolerances are predetermined. The unit covers application of introductory drafting skills to select and apply drawing protocols.

Manual drafting or computer-aided design (CAD) drawing equipment may be used.

If CAD skills are required, MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements, should be selected.

Drawings are completed to Australian Standard (AS) 1100.101–1992 Technical drawing – General principles.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of

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performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Identify drawing requirements	1.1	Identify information requirements for work and obtain all relevant job requirements and design specifications in accordance with workplace procedures
		1.2	Identify, interpret and analyse drawing requirements, specifications and relevant workplace information
		1.3	Interpret and apply industry terminology for drawing work
		1.4	Confirm communication practices required during drawing work
		1.5	Estimate time requirements for completing work
2	Select drawing features	2.1	Set up drawing list or register
		2.2	Determine level of detail and numbers of drawings required for work
		2.3	Plan presentation and layout, and determine drawing sheets, text style and size, and scales, appropriate for drawing work
		2.4	Identify features and applications of line types and thicknesses and select for drawing work
		2.5	Establish datums and dimensions
3	Prepare and detail drawings	3.1	Prepare drawings in plane orthogonal, isometric projection or equivalent
		3.2	Detail drawings in third angle projection, including auxiliary views, sections and assemblies
		3.3	Draw sections through engineering components incorporating correct use of cutting plane symbols and conventions

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		3.4	Include appropriate symbols for limits and fits, surface texture and geometric tolerances
		3.5	Resolve problems in consultation with a supervisor
		3.6	Check drawing compliance with work instructions and specifications
4	Select physical dimensions and produce engineering parts list	4.1	Where required, select components and/or materials from supplier/manufacturer catalogues using predetermined design specifications
		4.2	Produce an engineering parts list in accordance with workplace procedures
5	Complete drawing documentation	5.1	Obtain approval for drawings and/or parts list
		5.2	Store approved drawings and/or parts lists
		5.3	Catalogue and issue drawing and documentation in accordance with workplace procedures

Required Skills and Knowledge

Required skills

Required skills include:

- correctly using and maintaining equipment, including CAD
- manual drafting, filing and printing
- reading and interpreting specifications
- communicating with supervisor to confirm work requirements and outcomes
- visualising components
- preparing a drawing in plane orthogonal, isometric projection or equivalent
- determining drawing protocols required to complete drawing to industry standard
- selecting and locating text to support presentation
- establishing datums and dimensions for drawings
- drawing sections through an engineering component incorporating correct use of cutting plane symbols and conventions

Required knowledge

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Required knowledge includes:

- drafting media, including cartridge paper, tracing paper, drafting film and plain printing paper
- layout conventions
- effective use of blank space, location of notes and symbols
- sectioning
- overview of graphical techniques
- assembly drawings and explosion drawings
- schematics/line drawings, graphs and pictorials
- standard engineering drawing symbols, references and terminology
- application of surface finish symbols to drawings
- uses of different scales in industry applications
- uses and types of line weights
- uses and types of drawing sheets
- type of information provided with drawings

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria required skills and knowledge range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to produce basic engineering drawings to AS 1100.101–1992 Technical drawing – General principles.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts. Specifically the candidate must be able to: • work within typical site/teamwork structures and methods • apply worksite communication procedures • comply with organisational policies and procedures, including quality requirements • participate in work meetings • comply with quality requirements • use industry terminology

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	• apply appropriate safety procedures • produce drawings in orthogonal and isometric projection to AS 1100.101–1992 Technical drawing – General principles • produce drawings in third angle projection, including auxiliary views, sections and assemblies • include all details, symbols and notation.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with producing basic engineering graphics, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways, including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Range Statement

Specifications	Specifications may be obtained from: • design information • customer

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	• ideas • concepts/expectations/requirements • sketches • preliminary layouts
Drawings	Drawings may include: • plans • diagrams • charts
Consultation	Consultation may include • reference to appropriate personnel, including technical supervisors, manufacturers, suppliers, contractors and customers
Engineering parts list	Engineering parts list may include: • part name • description of part • material specification or part number • quantities • other details, as required
Issued drawings	Issued drawings may include: • hard copy • photographic, slide or transparency form, including presentation as a single drawing and/or with other drawings • support documentation as a package

Unit Sector(s)

Drawing, drafting and design

Custom Content Section

Not applicable.

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MEM30033A Use computer-aided design (CAD) to create and display 3-D models

Modification History

Release 1 - New unit of competency

Unit Descriptor

This unit of competency covers using a computer-aided design (CAD) program to produce and plot basic 3-D view drawings.

Application of the Unit

This unit applies to the production of 3-D models using CAD software and associated equipment. This will include the use of region and solid modelling techniques, section views and pre-drawn library files. Work also includes extraction of properties and application of basic rendering techniques.

All work is conducted under supervision.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Pre-Requisites

MEM30031A	Operate computer-aided design (CAD) system to produce basic drawing elements

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of

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performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Confirm drawing requirements	1.1	Confirm purpose, scope and information and presentation requirements for drawing
		1.2	Identify, interpret and analyse available information relevant to project and work requirements, and identify and address further information needs
		1.3	Identify computing equipment and software used in the organisation
		1.4	Identify work flow and procedures for work supervision and confirm communication requirements through project
		1.5	Examine requirements for presentation of drawings
2	Create and display 3-D views	2.1	Set up a 3-D environment on the screen to allow multiple viewing
		2.2	Create 3-D views on the screen by manipulation of drawing planes and insertion of 3-D geometric shapes
		2.3	Draw on any plane of the 3-D view
		2.4	Use editing functions to modify 3-D geometric shapes in creating 3-D views
		2.5	Produce wire line, surface and solid face displays in isometric, perspective and orthographic projections
3	Detail 3-D model	3.1	Extract the mass and surface area of a given solid model made from a nominated material
		3.2	Apply basic rendering techniques to render solid model to a specified set of criteria
4	Save completed	4.1	Save file in an appropriate format to enable retrieval and

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drawing file in various formats		use in a CAD system
	4.2	Save file in other formats to enable retrieval in other software applications

Required Skills and Knowledge

Required skills

Required skills include:

- reading and interpreting engineering specifications
- organising information
- using computer and peripherals
- using CAD program
- saving 3-D modes in various file formats
- preparing drawings in plane orthogonal, isometric projection or equivalent

Required knowledge

Required knowledge includes:

- region modelling techniques
- solid modelling techniques
- development of sectioned models
- use of cutting plane
- use of cross hatching
- use of pre-drawn library files and primitives to produce a 3-D model
- use of third level software to produce 3-D models
- how to extract mass and area properties
- how to extract area properties from region models
- application of basic rendering techniques to a 3-D model

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria required skills and knowledge range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to use CAD to create and display 3-D models.

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Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts. Specifically the candidate must be able to: • work within typical site/teamwork structures and methods • apply worksite communication procedures • comply with organisational policies and procedures, including quality requirements • participate in work meetings • comply with quality requirements • use industry terminology • apply appropriate safety procedures • identify modelling work requirements and determine appropriate software functions and features • apply CAD functions to produce a rendered 3-D model to Australian Standard (AS) 1100.101–1992 Technical drawing – General principles.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using CAD to create and display 3-D models or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways, including direct observation, supervisor's reports, project work,

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	samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Range Statement

Multiple viewing	Multiple viewing includes: • top views • front and side views • general 3-D view
3-D geometric shapes	3-D geometric shapes may include: • arcs and lines • spheres • cones • cylinders • boxes

Unit Sector(s)

Drawing, drafting and design

Custom Content Section

Not applicable.

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MSFFM1002 Operate basic woodworking machines

Modification History

Release 1 - New unit of competency

Application

This unit of competency covers operating basic woodworking machines used for sawing, planing, sanding and drilling in the production of furniture. It applies to a VET in Schools or pre-vocational program for new entrants to the furnishing industry.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Competency Field

Unit Sector

Furniture Making

Elements and Performance Criteria

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
1	Prepare for work	1.1	Work instructions are used to identify job requirements, including quality, materials, equipment, and quantities
		1.2	Work health and safety (WHS) requirements, including ventilation requirements and personal protection needs, are observed throughout the work
		1.3	Material for machining is selected and inspected for quality
		1.4	Machines, cutting tools and jigs are identified and checked for safe and effective operation
2	Operate machines	2.1	Safety equipment, including emergency stops, gauges, guards and controls are checked

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		2.2	Machine start-up procedure is carried out in accordance with manufacturer instructions
		2.3	Material is fed into machine in accordance with manufacturer instructions, safe handling procedures and standard workplace operating procedures
		2.4	Machine is operated in accordance with its designed capacity and purpose, tooling requirements and to manufacturer recommendations
		2.5	Machine operation is monitored to ensure product quality and output
		2.6	Waste quantities are minimised
		2.7	Items that do not meet quality requirements are recycled or discarded according to workplace procedures
		2.8	Problems with the required work and/or the operation of the machine are identified and reported to appropriate persons
3	Clean up work area and maintain equipment	3.1	Material that can be re-used is collected and stored
		3.2	Waste and scrap are removed following workplace procedures
		3.3	Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures
		3.4	Unserviceable equipment is reported in accordance with workplace procedures

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency. Detail on appropriate performance levels for each furnishing unit of competency in reading, writing, oral communication and numeracy utilising the Australian Core Skills Framework (ACSF) are provided in the Furnishing Training Package Implementation Guide.

Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential

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operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Range is restricted to essential operating conditions and any other variables essential to the work environment.

Basic woodworking machines include:

- cross cut saw
- rip saw
- band saw
- panel saw
- surface planer (buzzer/jointer)
- panel planer (thicknesser)
- bobbin sander
- disc sander
- belt sander (finisher) – stroke and linisher
- vertical drill press
- horizontal borer (single bit)

Tasks include:

- machine face
- machine edge
- off fence ripping
- freehand ripping
- freehand curve cutting
- parallel rip (oversize by 5 mm+)
- docking:
  - (oversize + 20 mm)
  - (accurate to +/- 0.25 mm)
  - square (no tolerance)
- cut flat panel board (off rip fence using scribe saw)
- cut flat panel board (off cross-cut fence using scribe saw)
- parallel plane width
- parallel plane thickness
- sand concave surface
- sand straight surface
- sand end grain and outside curve
- sand flat surfaces
- hinge boring
- drill holes to pre-determined depths vertically, selecting and replacing drill bits as required
- changing belts and blades
- drill holes to pre-determined depths horizontally (and to create a mortise)

Unit context includes:

- WHS requirements, including legislation, building codes, material safety management systems, hazardous substances and dangerous goods code, and local safe operating

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	procedures • work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • competency may be demonstrated in workplaces involved in the manufacture of solid timber furniture, domestic furniture, commercial furniture, kitchen and bathroom cabinets and/or furniture components
Materials to be machined include:	• solid timber and manufactured board
Personal protective equipment includes:	• that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures include:	• workplace procedures relating to the use of tools and equipment • work instructions, including job sheets, cutting lists, plans, drawings and designs • workplace procedures relating to reporting and communication • manufacturer specifications and operational procedures

Unit Mapping Information

Supersedes and is equivalent to LMFFM1002B Operate basic woodworking machines.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=0601ab95-583a-4e93-b2d4-cfb27b03ed73

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Assessment Requirements for MSFFM1002 Operate basic woodworking machines

Modification History

Release 1 - New unit of competency

Performance Evidence

- Identify work requirements and materials used in the work process
- Apply safe handling requirements for equipment, products and materials, including use of personal protective equipment
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self or others
  - prevent damage to goods, equipment and products
  - maintain required production output and product quality
- Operate and monitor the machines, including changing belts, blades and drill bits as required, and complete the tasks identified in the Range of Conditions for:
  - one (1) saw
  - one (1) planer
  - one (1) drill
  - one (1) sander
- Communicate ideas and information to enable confirmation of work requirements and specifications and the reporting of work outcomes and problems, interpret basic plans and follow safety procedures
- Minimise wastage of resources, including materials, time and money
- Work with others and in a team by recognising dependencies and using cooperative approaches to optimise work flow and productivity

Knowledge Evidence

- Characteristics, uses and limitations of woodworking machines
- General workplace quality standards and procedures
- Workplace safety policies and procedures
- Procedures for reporting machinery faults and material defects

Assessment Conditions

- Assessors must:
  - hold training and assessment competencies as determined by the National Skills Standards Council (NSSC) or its successors

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  - have vocational competency in the furnishing industry at least to the level being assessed with broad industry knowledge and experience, usually combined with a relevant industry qualification
  - be familiar with the current skills and knowledge used and have relevant, current experience in the furnishing industry.
- Assessment methods must confirm consistency of performance over time rather than a single assessment event and in a range of workplace relevant contexts.
- Assessment must be by observation of relevant tasks with questioning on underpinning knowledge and, where applicable, multimedia evidence, supervisor's reports, projects and work samples.
- Assessment is to be conducted on single units of competency or in conjunction with other related units of competency. Foundation skills are integral to competent performance in the unit and should not be assessed separately.
- Assessment must occur on the job or in a workplace simulated facility with relevant process, equipment, materials, work instructions and deadlines.
- Access is required to basic woodworking machinery, standard operating procedures and materials.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=0601ab95-583a-4e93-b2d4-cfb27b03ed73

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MSFFM2001 Use furniture making sector hand and power tools

Modification History

Release 1 - New unit of competency

Application

This unit of competency covers using hand and power tools in applications relating to furniture making.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Competency Field

Unit Sector

Furniture Making

Elements and Performance Criteria

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
1	Identify hand and power tools	1.1	Types of hand and power tools and their functions are identified
		1.2	Work health and safety (WHS) requirements, including personal protection needs, are observed throughout the work
		1.3	Sources of power supply are recognised
2	Select and use hand tools	2.1	Hand tools selected are consistent with needs of the job, checked for serviceability and safety, and any faults reported to supervisor
		2.2	Equipment is selected to hold or support material for hand tools application where applicable

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		2.3	Material is located and held in position for hand tool application
		2.4	Hand tools are safely and effectively used according to their intended use and safely located when not in immediate use
3	Select and use power tools	3.1	Power tools are selected consistent with needs of the job in accordance with conventional work practice, are visually checked for serviceability and safety in accordance with WHS requirements, and any faults reported to supervisor
		3.2	Equipment is selected to hold or support materials for power tool application as applicable
		3.3	Material is located and held in position for power tool application as applicable
		3.4	Power tools are safely and effectively used in application processes and safely located when not in use
4	Clean up work area and tools	4.1	All tools are cleaned, maintained and stored
		4.2	Equipment is cleaned, maintained and stored
		4.3	Work area is cleared and waste removed

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency. Detail on appropriate performance levels for each furnishing unit of competency in reading, writing, oral communication and numeracy utilising the Australian Core Skills Framework (ACSF) are provided in the Furnishing Training Package Implementation Guide.

Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Range is restricted to essential operating conditions and any other variables essential to the work environment.

Hand tools for furniture	• hand planes • chisels

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making include:	• hand saws • spokeshave • hammers (claw, Warrington, tack and ball pein) • mallet • marking-out tools • files • rasps • scraper • screwdrivers and hand drills
Power tools for furniture making include:	• drop saw • circular power saw • planer • drill • jig saw • router • trimmer • biscuit machine • brad/nail and staple gun and sanders
Unit scope includes:	• individuals to demonstrate skill, accuracy and dexterity in the application of tools to perform work tasks which should include dressing materials, cutting joints, finishing surfaces, cutting straight and compound angles, jointing materials, edge trimming and the basic sharpening of cutting tools
Unit context includes:	• WHS requirements, including legislation, building codes, material safety management systems, hazardous substances and dangerous goods code, and local safe operating procedures • work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manufacturer' s specifications, manual handling procedures and organisation insurance requirements
Fault reporting includes:	• verbal or written reporting
Personal protective equipment includes:	• that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures include:	• workplace procedures relating to the use of tools and equipment • work instructions, including job sheets, cutting lists, plans, drawings and designs • workplace procedures relating to reporting and communication • manufacturer specifications and operational procedures

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Unit Mapping Information

Supersedes and is equivalent to LMFFM2001B Use furniture making sector hand and power tools.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=0601ab95-583a-4e93-b2d4-cfb27b03ed73

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Assessment Requirements for MSFFM2001 Use furniture making sector hand and power tools

Modification History

Release 1 - New unit of competency

Performance Evidence

- Locate and apply relevant information related to hand and power tools
- Apply safe handling requirements for equipment, products and materials, including use of personal protective equipment
- Follow work instructions, operating procedures and inspection practices to:
  - minimise the risk of injury to self or others
  - prevent damage to goods, tools, equipment or products
  - maintain required production output and product quality
- Adopt and carry out correct procedures prior to and during use of the range of hand and power tools stipulated in the Range of Conditions
- Carry out operator maintenance on hand and power tools, including the grinding and sharpening of:
  - chisels
  - hard plane blades or irons
  - drill bits
- Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements
- Communicate ideas and information to enable confirmation of work requirements and specifications and the reporting of work outcomes and problems, interpret basic plans and follow safety procedures
- Minimise waste of resources, including materials, time and money
- Work with others and in a team by recognising dependencies and using cooperative approaches to optimise work flow and productivity

Knowledge Evidence

- Types, characteristics, uses, limitations and maintenance requirements of hand tools commonly used in furniture production
- Types, characteristics, uses, limitations and maintenance requirements of power tools commonly used in furniture production
- Workplace safety requirements and WHS legislation
- Work flow within the workplace

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Assessment Conditions

- Assessors must:
  - hold training and assessment competencies as determined by the National Skills Standards Council (NSSC) or its successors
  - have vocational competency in the furnishing industry at least to the level being assessed with broad industry knowledge and experience, usually combined with a relevant industry qualification
  - be familiar with the current skills and knowledge used and have relevant, current experience in the furnishing industry.
- Assessment methods must confirm consistency of performance over time rather than a single assessment event and in a range of workplace relevant contexts.
- Assessment must be by observation of relevant tasks with questioning on underpinning knowledge and, where applicable, multimedia evidence, supervisor's reports, projects and work samples.
- Assessment is to be conducted on single units of competency or in conjunction with other related units of competency. Foundation skills are integral to competent performance in the unit and should not be assessed separately.
- Assessment must occur on the job or in a workplace simulated facility with relevant process, equipment, materials, work instructions and deadlines.
- Access is required to furniture making sector hand and power tools, and materials used in the manufacturing and/or installation of furnishing products.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=0601ab95-583a-4e93-b2d4-cfb27b03ed73

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MSFFM2002 Assemble furnishing components

Modification History

Release 1 - New unit of competency

Application

This unit of competency covers assembling of timber components to produce furniture frames or furniture.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Competency Field

Unit Sector

Furniture Making

Elements and Performance Criteria

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
1	Prepare for assembly	1.1	Work instructions are used to determine job requirements, including design, tolerances, process, materials, finish and quantity
		1.2	Assembly sequence is planned
		1.3	Procedures are determined for checking quality at each stage of the process
		1.4	Work health and safety (WHS) requirements, including personal protection needs, are observed throughout the work
		1.5	Suitable work area is selected for the task
		1.6	Tools and equipment suitable to the fixing method are

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			selected and checked for safe operation
		1.7	Components, hardware, fittings and attachments are collected
		1.8	Fixing and joining devices are selected in line with work instructions and type of materials to be joined
		1.9	Jigs are selected and checked for suitability of purpose
2	Assemble components	2.1	Components are laid out and joined using jigs and appropriate fastenings
		2.2	Hand and/or power tools and equipment are used as required
		2.3	Components are prepared, assembled and fitted in accordance with specifications
		2.4	Assembled component is checked for compliance with specifications
		2.5	Components which do not meet quality specifications are repaired or tagged for further processing or recycling/disposal
		2.6	Finished products are organised and stored in holding area
3	Clean work area and maintain equipment	3.1	Faulty and/or defective equipment is tagged and reported in accordance with workplace procedures
		3.2	Waste and scrap are removed following workplace procedures
		3.3	Tools and equipment used are cleaned, inspected for serviceable condition and stored appropriately in accordance with workplace procedures
		3.4	Equipment and work area clean-up is maintained in accordance with workplace procedures

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Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency. Detail on appropriate performance levels for each furnishing unit of competency in reading, writing, oral communication and numeracy utilising the Australian Core Skills Framework (ACSF) are provided in the Furnishing Training Package Implementation Guide.

Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Range is restricted to essential operating conditions and any other variables essential to the work environment.

Furnishing components include:	• carcasses • doors • drawers • frames • shelves • ends • tops
Unit context includes:	• WHS requirements, including legislation, building codes, material safety management systems, hazardous substances and dangerous goods code and local safe operating procedures • work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • work requires individuals to demonstrate some discretion, judgement and problem solving in the assembly of furnishing components • competency may be demonstrated in workplaces involved in the manufacture of solid timber furniture, domestic furniture, commercial furniture, kitchen and bathroom cabinets and/or furniture components
Tools and equipment include:	• measuring tapes or rulers • hammers • mallets • squares • bevels • chisels • planes

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	• hand saws • power saws • power drills/screwdrivers • clamps/cramps • screwdrivers and/or spanners • pincers • pneumatic tools, compressor and spray equipment
Materials to be used include:	• timber • manufactured board • glues • screws • nails • dowels and knock-down fittings
Assembled component checking is to cover:	• squareness, alignment and wind • hardware, fittings and attachments • functionality and tolerances • conformity to work instruction and quality requirements
Storage requirements include:	• ensuring that there is no obstruction to traffic • components are not damaged in storage • incompatible items are not stored together • products are arranged to match the sequence of work
Personal protective equipment includes:	• that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures include:	• workplace procedures relating to the use of tools and equipment • work instructions, including job sheets, cutting lists, plans, drawings and designs • manufacturer specifications and operational procedures

Unit Mapping Information

Supersedes and is equivalent to LMFFM2002B Assemble furnishing components.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=0601ab95-583a-4e93-b2d4-cfb27b03ed73

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Assessment Requirements for MSFFM2002 Assemble furnishing components

Modification History

Release 1 - New unit of competency

Performance Evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and materials, including use of personal protective equipment
- Follow work instructions, operating procedures and inspection practices to:
  - minimise the risk of injury to self or others
  - prevent damage to goods, equipment and products
  - maintain required production output and product quality
- Assemble at least four (4) furnishing components from the list in the Range Statement
- Use mathematical ideas and techniques to correctly complete measurements and estimate material requirements
- Communicate ideas and information to enable confirmation of work requirements and specifications and the reporting of work outcomes and problems, interpret basic plans and follow safety procedures
- Minimise wastage of resources, including materials, time and money
- Work with others and in a team by recognising dependencies and using cooperative approaches to optimise work flow and productivity

Knowledge Evidence

- Types, characteristics, uses and limitations of common furnishing components
- Interpretation of basic furniture plans
- Identification of hand and/or power tools, materials, equipment, processes and procedures
- Work flow in relation to furniture production

Assessment Conditions

- Assessors must:
  - hold training and assessment competencies as determined by the National Skills Standards Council (NSSC) or its successors
  - have vocational competency in the furnishing industry at least to the level being assessed with broad industry knowledge and experience, usually combined with a relevant industry qualification
  - be familiar with the current skills and knowledge used and have relevant, current experience in the furnishing industry.

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- Assessment methods must confirm consistency of performance over time rather than a single assessment event and in a range of workplace relevant contexts.
- Assessment must be by observation of relevant tasks with questioning on underpinning knowledge and, where applicable, multimedia evidence, supervisor's reports, projects and work samples.
- Assessment is to be conducted on single units of competency or in conjunction with other related units of competency. Foundation skills are integral to competent performance in the unit and should not be assessed separately.
- Assessment must occur on the job or in a workplace simulated facility with relevant process, equipment, materials, work instructions and deadlines.
- Access is required to tools, equipment and materials required to assemble furnishing components.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=0601ab95-583a-4e93-b2d4-cfb27b03ed73

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MSFFM2003 Select and apply hardware

Modification History

Release 1 - New unit of competency

Application

This unit of competency covers selecting and applying hardware to new and refurbished furniture.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Competency Field

Unit Sector

Furniture Making

Elements and Performance Criteria

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
1	Plan and prepare work	1.1	Work instructions are used to determine job requirements, including design, colour, finish process and required hardware quality
		1.2	Work health and safety (WHS) requirements, including personal protection needs, are observed throughout the work
		1.3	Types of hardware are identified and selected for the work
		1.4	Tools, equipment and accessories for application are identified and checked for safe and effective operation
		1.5	Surfaces are cleaned and prepared to enable accurate colour matching

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2	Apply and/or fit and finish	2.1	Hardware items are laid out/placed in the required design
		2.2	Machinery is used in accordance with workplace procedures, including use of personal protective equipment
		2.3	Joining/securing process is undertaken according to workplace procedures
		2.4	Adhesives are applied according to workplace procedures and/or manufacturer instructions
		2.5	Work is checked against required quality standards
3	Finalise operation and maintain equipment	3.1	Work area is cleaned, hand and/or power tools and equipment are cleaned, maintained and stored in accordance with workplace procedures
		3.2	Machinery is cleaned and left in a safe mode
		3.3	Faulty and/or defective equipment is tagged and reported in accordance with workplace practices
		3.4	Unused hardware is collected and stored for re-use or disposal following workplace procedures
		3.5	Waste and scrap materials are dealt with following workplace procedures

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency. Detail on appropriate performance levels for each furnishing unit of competency in reading, writing, oral communication and numeracy utilising the Australian Core Skills Framework (ACSF) are provided in the Furnishing Training Package Implementation Guide.

Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Range is restricted to essential operating conditions and any other variables essential to the work environment.

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Hardware includes:	• hinges • handles • drawer-runners • metal drawer systems • sliding rail systems • rotating storage systems and slide-out storage systems
Unit context includes:	• WHS requirements, including legislation, building codes, material safety management systems, hazardous substances and dangerous goods code, and local safe operating procedures • work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • work requires individuals to demonstrate some discretion, judgement and problem solving in selecting and applying hardware • competency may be demonstrated in workplaces involved in the manufacture of solid timber furniture, domestic furniture, commercial furniture, kitchen and bathroom cabinets and/or furniture components
Tools and equipment include:	• measuring tapes or rulers • levelling devices • hammers • mallets • squares • bevels • chisels • planes • hand saws • power saws • power drills/screwdrivers • pneumatic tools, compressor and spray equipment • clamps • screwdrivers • pincers
Materials include:	• timber • manufactured board • hardware consumables • cleaning chemicals and materials
Personal protective equipment includes:	• that prescribed under legislation, regulations and enterprise policies and practices

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Information and procedures include:	• workplace procedures relating to the use of tools and equipment • work instructions, including job sheets, cutting lists, plans, drawings and designs • workplace procedures relating to reporting and communication • manufacturer specifications and operational procedures

Unit Mapping Information

Supersedes and is equivalent to LMFFM2003B Select and apply hardware.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=0601ab95-583a-4e93-b2d4-cfb27b03ed73

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Assessment Requirements for MSFFM2003 Select and apply hardware

Modification History

Release 1 - New unit of competency

Performance Evidence

- Interpret work order and locate relevant information
- Apply safe handling requirements for equipment, products and materials, including use of personal protective equipment
- Follow work instructions, operating procedures and inspection practices to:
  - prevent damage to goods, equipment and products
  - maintain required production output and product quality
  - minimise the risk of injury to self or others
- Select and apply/fit six (6) different items of hardware
- Use mathematical ideas and techniques to correctly complete measurements, calculate area and estimate material requirements
- Communicate ideas and information to enable confirmation of work requirements and specifications and the reporting of work outcomes and problems, interpret basic plans and follow safety procedures
- Minimise wastage of resources, including materials, time and money
- Work with others and in a team by recognising dependencies and using cooperative approaches to optimise work flow and productivity

Knowledge Evidence

- Types, characteristics, uses and limitations of hardware
- Interpretation of plan representation of furniture design
- Preparation of drawings/set-outs
- Identification of hand and/or power tools, materials, equipment, processes and procedures
- Work flow in relation to furniture production

Assessment Conditions

- Assessors must:
  - hold training and assessment competencies as determined by the National Skills Standards Council (NSSC) or its successors
  - have vocational competency in the furnishing industry at least to the level being assessed with broad industry knowledge and experience, usually combined with a relevant industry qualification

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    - be familiar with the current skills and knowledge used and have relevant, current experience in the furnishing industry.
- Assessment methods must confirm consistency of performance over time rather than a single assessment event and in a range of workplace relevant contexts.
- Assessment must be by observation of relevant tasks with questioning on underpinning knowledge and, where applicable, multimedia evidence, supervisor's reports, projects and work samples.
- Assessment is to be conducted on single units of competency or in conjunction with other related units of competency. Foundation skills are integral to competent performance in the unit and should not be assessed separately.
- Assessment must occur on the job or in a workplace simulated facility with relevant process, equipment, materials, work instructions and deadlines.
- Access is required to plans, hand and/or power tools, equipment, hardware materials and woodworking machinery.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=0601ab95-583a-4e93-b2d4-cfb27b03ed73

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MSFFM2005 Join solid timber

Modification History

Release 1 - New unit of competency

Application

This unit of competency covers joining solid timber required for the manufacture of solid timber flat surfaces.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Competency Field

Unit Sector

Furniture Making

Elements and Performance Criteria

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1 Prepare the work	1.1 Work instructions are used to determine job requirements, including process, materials, finish and quantity
	1.2 Work sequence is planned
	1.3 Procedures are determined for checking quality at each stage of the process
	1.4 Work health and safety (WHS) requirements, including personal protection needs, are observed throughout the work
	1.5 Suitable work area is selected for the task
	1.6 Tools and equipment suitable for application are identified and checked for safe and effective operation

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2	Lay out and prepare materials	2.1	Timbers are selected and checked for defects following work instructions
		2.2	Suitable joining processes are selected and prepared
		2.3	Timbers are prepared for joining and laid out
3	Join timber	3.1	Timbers are measured, marked and cut to size
		3.2	Machinery is used in accordance with workplace procedures, including use of personal protective equipment
		3.3	Adhesives are applied according to workplace procedures and/or manufacturer instructions
		3.4	Final trim and finishing are completed to specifications
		3.5	Work is checked against required quality standards
4	Finalise operation and maintain equipment	4.1	Work area is cleaned, hand and/or power tools and equipment are cleaned, maintained and stored in accordance with workplace procedures
		4.2	Machinery is cleaned and left in a safe mode
		4.3	Faulty and/or defective equipment is tagged and reported in accordance with workplace practices
		4.4	Off-cuts and unused materials are collected and stored for re-use or disposal following workplace procedures
		4.5	Waste and scrap materials are dealt with following workplace procedures

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency. Detail on appropriate performance levels for each furnishing unit of competency in reading, writing, oral communication and numeracy utilising the Australian Core Skills Framework (ACSF) are provided in the Furnishing Training Package Implementation Guide.

Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the

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candidate, accessibility of the item, and local industry and regional contexts) are included. Range is restricted to essential operating conditions and any other variables essential to the work environment.

Edge joining methods include:	• butt and dowel • moulded edge joint (finger-joint, tongue in groove and zig-zag) • biscuit joint • slip-tongue joint
Unit context includes:	• WHS requirements, including legislation, building codes, material safety management systems, hazardous substances and dangerous goods code, and local safe operating procedures • work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • work requires individuals to demonstrate some discretion, judgement and problem solving in joining solid timber • competency may be demonstrated in workplaces involved in the manufacture of solid timber furniture, domestic furniture, commercial furniture, kitchen and bathroom cabinets and/or furniture components
Machines include:	• panel saw • cross-cut saw • rip saw • surface planers • panel planer • spindle moulder • sanders and vertical and horizontal drills
Tools and equipment include:	• measuring tapes or rulers • hammers • mallets • squares • bevels • chisels • planes • hand saws • power saws • power drills • biscuit machines • pneumatic tools, compressor and spray equipment • dowel jigs • hoses

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Materials include:	• clamps and pincers • adhesives • abrasives and cleaning materials
Personal protective equipment includes:	• that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures include:	• workplace procedures relating to the use and operation of tools and equipment • workplace instructions, including job sheets, plans, drawings and designs • workplace procedures relating to reporting and communications • manufacturer instructions for the use of equipment and materials

Unit Mapping Information

Supersedes and is equivalent to LMFFM2005B Join solid timber.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=0601ab95-583a-4e93-b2d4-cfb27b03ed73

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Assessment Requirements for MSFFM2005 Join solid timber

Modification History

Release 1 - New unit of competency

Performance Evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and materials, including use of personal protective equipment
- Follow work instructions, operating procedures and inspection practices to:
  - minimise the risk of injury to self and others
  - prevent damage to goods, equipment and products
  - maintain required production output and product quality
- Join at least four (4) solid timber tops of a minimum of three (3) sections and using a minimum of four (4) different edge joining methods
- Use mathematical ideas and techniques to correctly complete measurements, calculate area and estimate material
- Communicate ideas and information to enable confirmation of work requirements and specifications and the reporting of work outcomes and problems, interpret basic plans and follow safety procedures
- Minimise wastage of resources, including materials, time and money
- Work with others and in a team by recognising dependencies and using cooperative approaches to optimise work flow and productivity

Knowledge Evidence

- Types, characteristics (including cupping, expansion, twisting, bowing, spring and grain direction), uses and limitations of timbers
- Interpretation of plan representation of furniture design
- Joining techniques and their effect on timbers
- Types of sawing methods, including back sawn and quarter sawn, and the impact of these on joining
- Preparation of drawings/set-outs
- Identification of hand and/or power tools, materials, equipment, processes and procedures
- Work flow in relation to furniture production

Assessment Conditions

- Assessors must:
  - hold training and assessment competencies as determined by the National Skills Standards Council (NSSC) or its successors

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  - have vocational competency in the furnishing industry at least to the level being assessed with broad industry knowledge and experience, usually combined with a relevant industry qualification
  - be familiar with the current skills and knowledge used and have relevant, current experience in the furnishing industry.
- Assessment methods must confirm consistency of performance over time rather than a single assessment event and in a range of workplace relevant contexts.
- Assessment must be by observation of relevant tasks with questioning on underpinning knowledge and, where applicable, multimedia evidence, supervisor's reports, projects and work samples.
- Assessment is to be conducted on single units of competency or in conjunction with other related units of competency. Foundation skills are integral to competent performance in the unit and should not be assessed separately.
- Assessment must occur on the job or in a workplace simulated facility with relevant process, equipment, materials, work instructions and deadlines.
- Access is required to plans, hand and/or power tools, equipment, joining and finishing materials and woodworking machinery.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=0601ab95-583a-4e93-b2d4-cfb27b03ed73

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MSFSF1001 Produce basic soft furnishing accessories

Modification History

Release 1 - New unit of competency

Application

This unit of competency covers producing basic soft furnishing accessories, such as basic cushions and other decorative items, following the requirements of patterns.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Competency Field

Unit Sector

Soft Furnishing

Elements and Performance Criteria

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
1	Identify work requirements	1.1	Job requirements are identified from work instructions and patterns
		1.2	Work health and safety (WHS) requirements, including ergonomic criteria and personal protection needs, are observed throughout the work
		1.3	Pattern is interpreted to determine tool, equipment and material requirements
		1.4	Instructions for sequencing of work and particular measurements or adjustments are interpreted
		1.5	Work sequence is planned, including quality checkpoints
2	Prepare for work	2.1	Suitable work area is selected for the tasks

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		2.2	Materials are selected to match customer requirements, suitability for the purpose and work instructions
		2.3	Potential hazards are identified from observation of the tools, equipment, materials and workplace reference material
		2.4	Required tools, equipment and materials are collected in the work area
3	Complete production	3.1	Soft furnishing accessories are produced following work instructions
		3.2	Work is checked against patterns and worksheets at the identified checkpoints
		3.3	Non-conformity with the required quality standards is rectified
4	Finalise operations	4.1	Completed work is checked against required quality standards
		4.2	Documentation is completed following workplace procedures
		4.3	Work area is cleaned, and tools and equipment are returned to storage
		4.4	Unused materials are returned to storage and waste and scrap are dealt with following workplace procedures

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency. Detail on appropriate performance levels for each furnishing unit of competency in reading, writing, oral communication and numeracy utilising the Australian Core Skills Framework (ACSF) are provided in the Furnishing Training Package Implementation Guide.

Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Range is restricted to essential operating conditions and any other variables essential to the

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work environment.

Unit context includes:	• WHS requirements, including legislation, building codes, material safety management systems, hazardous and dangerous goods codes, and local safe operating procedures or equivalent • work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • work requires individuals to demonstrate some discretion, judgement and problem solving
Soft furnishing accessories include:	• basic cushions • bolsters • soft tableware and slip-on covers

Tools and equipment include:	• measuring and calculating equipment:
	  • tapes
	  • rulers
	  • calculators
	  • computers
	• fabric and general cutting and sewing tools:
	  • scissors
	  • saws
	  • drills
	  • staplers
	  • sewing machines
	  • hemming machines
	  • overlockers
	  • glue guns

Materials include:	• plain and patterned fabric • velvet • vinyl • piping cords • wadding • foam • zips and fasteners
Pattern interpretation includes:	• the determination of type of material specified, required tools and equipment for the task, number and type of soft furnishing accessories to be produced, and quality requirements
Personal protective	• that prescribed under legislation, regulations and enterprise policies and practices

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equipment includes:

Information and procedures include:

- workplace procedures relating to the use of tools and equipment
- work instructions, including job sheets, cutting lists, plans, drawings and designs
- workplace procedures relating to reporting and communication
- manufacturer specifications and operational procedures

Unit Mapping Information

Supersedes and is equivalent to LMFSF1001B Produce basic soft furnishing accessories.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=0601ab95-583a-4e93-b2d4-cfb27b03ed73

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Assessment Requirements for MSFSF1001 Produce basic soft furnishing accessories

Modification History

Release 1 - New unit of competency

Performance Evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and materials, including use of personal protective equipment
- Identify materials used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self or others
  - prevent damage to goods, equipment and products
  - maintain required production output and product quality
- Interpret patterns and produce at least one (1) type of soft furniture accessory
- Use mathematical ideas and techniques to correctly complete measurements, calculate area and estimate material requirements
- Communicate ideas and information to enable confirmation of work requirements and specifications and the reporting of work outcomes and problems, interpret basic plans and follow safety procedures
- Avoid backtracking, work flow interruptions or wastage
- Work with others and in a team by recognising dependencies and using cooperative approaches to optimise work flow and productivity

Knowledge Evidence

- Types, characteristics, uses and limitations of basic soft furnishing materials
- Interpretation of patterns
- Identification of equipment, processes and procedures
- Work flow in relation to soft furnishing accessory production

Assessment Conditions

- Assessors must:
  - hold training and assessment competencies as determined by the National Skills Standards Council (NSSC) or its successors
  - have vocational competency in the furnishing industry at least to the level being assessed with broad industry knowledge and experience, usually combined with a relevant industry qualification

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  - be familiar with the current skills and knowledge used and have relevant, current experience in the furnishing industry.
- Assessment methods must confirm consistency of performance over time rather than a single assessment event and in a range of workplace relevant contexts.
- Assessment must be by observation of relevant tasks with questioning on underpinning knowledge and, where applicable, multimedia evidence, supervisor's reports, projects and work samples.
- Assessment is to be conducted on single units of competency or in conjunction with other related units of competency. Foundation skills are integral to competent performance in the unit and should not be assessed separately.
- Assessment must occur on the job or in a workplace simulated facility with relevant process, equipment, materials, work instructions and deadlines.
- Access is required to soft furnishing accessory patterns and materials.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=0601ab95-583a-4e93-b2d4-cfb27b03ed73

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MSFSF2001 Cut single layer fabrics

Modification History

Release 1 - New unit of competency

Application

This unit of competency covers measuring out and cutting single layer fabrics for manufacture of curtains and soft furnishing accessories. It does not apply to cutting from patterns.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Competency Field

Unit Sector

Soft Furnishing

Elements and Performance Criteria

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
1	Plan work operations	1.1	Required fabrics, number of items to be cut and required equipment are identified
		1.2	Fabric sizes to be cut are identified from work order plus any required allowances
		1.3	Work health and safety (WHS) requirements, including ergonomic criteria and personal protection needs, are observed throughout the work.
		1.4	Suitable work area is selected, tidied and cleaned of any contaminants
		1.5	Suitable scissors and/or blades are selected and checked prior to use for appropriate sharpness, set, operation and safe condition

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		1.6	Fabrics are selected in accordance with work order and laid out smooth and square
2	Prepare materials for cutting	2.1	Fabrics are inspected for flaws and appropriate finish
		2.2	Naps, direction, pattern matches and face of the materials are identified
		2.3	Tools and equipment are checked for operation
3	Complete cutting operations	3.1	Cutting is completed with cut out materials identified/labelled where required
		3.2	Any measurements for pleat lines, hems, headings and any special seam allowances are marked out using workplace approved methods
		3.3	Where required, fabrics are hung using appropriate protective covers and care label information is attached
		3.4	Cut lengths are despatched to next process following workplace procedures
		3.5	Unused materials are stored as required
		3.6	Workplace required documentation is completed following appropriate procedures
		3.7	Work area is cleaned and damaged tools tagged as required
		3.8	Waste is collected and bundled for recycling/re-use as required

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency. Detail on appropriate performance levels for each furnishing unit of competency in reading, writing, oral communication and numeracy utilising the Australian Core Skills Framework (ACSF) are provided in the Furnishing Training Package Implementation Guide.

Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the

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candidate, accessibility of the item, and local industry and regional contexts) are included. Range is restricted to essential operating conditions and any other variables essential to the work environment.

Unit context includes:	• WHS requirements, including legislation, building codes, material safety management systems, hazardous and dangerous goods codes, and local safe operating procedures or equivalent • work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, manual handling procedures and organisation insurance requirements • work requires individuals to demonstrate some discretion, judgement and problem solving

Tools and equipment include:	• cutting equipment, including scissors and cutting machines
	• measuring and calculating equipment:
	  • tapes
	  • rulers
	  • calculators and computers

Products to be constructed include:	• curtains • drapes • swags • cushions • upholstered furniture components
Personal protective equipment includes:	• that prescribed under legislation, regulations and enterprise policies and practices
Information and procedures include:	• workplace procedures relating to the use of tools and equipment • work instructions, including job sheets, cutting lists, plans, drawings and designs • workplace procedures relating to reporting and communication • manufacturer specifications and operational procedures

Unit Mapping Information

Supersedes and is equivalent to LMFSF2001B Cut single layer fabrics.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=0601ab95-583a-4e93-b2d4-cfb27b03ed73

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Assessment Requirements for MSFSF2001 Cut single layer fabrics

Modification History

Release 1 - New unit of competency

Performance Evidence

- Interpret work order and locate and apply relevant information
- Apply safe handling requirements for equipment, products and materials, including use of personal protective equipment
- Identify materials used in the work process
- Follow work instructions, operating procedures and inspection processes to:
  - minimise the risk of injury to self or others
  - prevent damage to goods, equipment and products
  - maintain required production output and product quality
- Identify materials used and any special marking out requirements
- Measure accurately and cut fabric quantities to minimise waste and produce consistent quality items for at least five (5) different types of material or product
- Use mathematical ideas and techniques to correctly complete measurements, calculate area and estimate material requirements
- Communicate ideas and information to enable confirmation of work requirements and specifications and the reporting of work outcomes and problems, interpret basic plans and follow safety procedures
- Avoid backtracking, work flow interruptions or wastage
- Work with others and in a team by recognising dependencies and using cooperative approaches to optimise work flow and productivity

Knowledge Evidence

- Work requirements, including workplace standards
- Fabric types, common faults and inspection procedures
- Design features of the finished items in relation to attractive use of fabric patterns
- Cutting equipment and techniques
- Effect of cutting on fabrics

Assessment Conditions

- Assessors must:
  - hold training and assessment competencies as determined by the National Skills Standards Council (NSSC) or its successors

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  - have vocational competency in the furnishing industry at least to the level being assessed with broad industry knowledge and experience, usually combined with a relevant industry qualification
  - be familiar with the current skills and knowledge used and have relevant, current experience in the furnishing industry.
- Assessment methods must confirm consistency of performance over time rather than a single assessment event and in a range of workplace relevant contexts.
- Assessment must be by observation of relevant tasks with questioning on underpinning knowledge and, where applicable, multimedia evidence, supervisor's reports, projects and work samples.
- Assessment is to be conducted on single units of competency or in conjunction with other related units of competency. Foundation skills are integral to competent performance in the unit and should not be assessed separately.
- Assessment must occur on the job or in a workplace simulated facility with relevant process, equipment, materials, work instructions and deadlines.
- Access is required to fabrics, including linings and interlinings, calculator and other workplace calculating and cutting equipment.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=0601ab95-583a-4e93-b2d4-cfb27b03ed73

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MSL913001A Communicate with other people

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to receive and pass on written and oral messages, provide relevant information in response to requests within timelines and demonstrate effective interpersonal skills.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory assistants and instrument operators working in all industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Receive and act upon instructions	1.1. Listen attentively to instructions and respond appropriately 1.2. Clarify instructions to ensure a complete understanding of the task
2. Receive and convey messages	2.1. Receive verbal and written messages and respond appropriately 2.2. Record and convey information so that messages are understood
3. Demonstrate appropriate interpersonal skills	3.1. Follow enterprise procedures which reflect equal opportunity, anti-discrimination and non-harassment legislative requirements 3.2. Demonstrate effective interpersonal skills during everyday interactions
4. Provide appropriate information	4.1. Deal with inquiries in accordance with enterprise customer service requirements 4.2. Establish details of inquiry by questioning and summarising 4.3. Access and provide relevant information that meets own authorisation and confidentiality requirements 4.4. Redirect inquiries to relevant personnel for

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ELEMENT	PERFORMANCE CRITERIA
	resolution if beyond own area of responsibility 4.5. Complete all workplace documents legibly and accurately in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • communicating effectively with people from different organisational levels and diverse cultural backgrounds • using available communication equipment (e.g. telephone, online and hard copy directories, email, fax, intranet and internet) • listening attentively and clarifying messages and instructions to confirm their meaning • responding to calls and messages within accepted enterprise timelines • locating relevant sources of information • providing accurate information in an effective and timely manner • understanding colloquial, scientific and technical terminology appropriate to theexpected level of knowledge in the workplace • legibly and accuratelycompleting relevant workplace documents • promoting cooperation through personal interactions
Required knowledge
Required knowledge includes: • enterprise customer service standards and procedures • standard operating procedures (SOPs) for routine technical tasks undertaken by candidate • principles of effective interpersonal interactions • equal opportunity, anti-discrimination and anti-harassment requirements • communication protocols • relevant health, safety and environment requirements • products and services provided by the enterprise • layout of the enterprise and laboratory • role of laboratory services to the enterprise and customers • organisational structure

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REQUIRED SKILLS AND KNOWLEDGE
Specific industry Additional knowledge requirements may apply for different industry sectors. For example: Manufacturing, food processing and construction materials testing industry sectors: • instructions to production staff when altering production mixes as a result of laboratory analysis Biomedical industry sector: • verification and signature requirements for the receipt and release of human specimens (such as blood transfusion products, blood alcohol samples and urine for drug testing)

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • communicate with people effectively by listening attentively and clarifying messages and instructions to confirm their meaning • provide accurate and timely information using appropriate terminology • complete workplace documents legibly and accurately • use personal interactions to promote cooperation.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL933002AContribute to the achievement of quality objectives*. Resources may include: • enterprise procedures and documents • communication equipment (for example, telephone,

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EVIDENCE GUIDE	
	online and hard copy directories, email, fax, intranet and internet).
Method of assessment	The following assessment methods are suggested: • review of messages and workplace documentation prepared by the candidate • feedback from peers, customers and supervisors • observation of the candidate's performance of a wide range of technical and administrative tasks • questions to assess understanding of relevant workplace procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Manufacturing** A technician in a petroleum refinery asked a laboratory assistant to 'go down to the cat and take a sample of the bottoms,' not realising that the assistant had only just started work with the company. The assistant looked at the technician in amazement, not knowing whether to pretend to understand, maintain self esteem, or clarify the instructions for the task. The assistant decided on the latter - to ask for clarification - and the technician repeated the instructions without using jargon. The laboratory assistant then proceeded to the catalytic cracker to take the sample as per the appropriate standard operating procedures.

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	Biomedical The regular collection staff were not present when a flustered client came into the outpatient clinic with a domestic container full of straw coloured fluid. The receptionist knew what urine collection containers usually looked like and this was clearly not one. The receptionist called for help from the laboratory in the absence of collection staff. A technical officer was sent. The officer quickly realised that a recollection would be requested and because this would be inconvenient to the patient, tried to seek an explanation from them as to why the correct container was not used. The technical officer then explained as clearly and gently as possible the reasons for the recollection and why the substitute container could not be used. The officer confirmed that the patient was clear on the collection procedure and checked that the labels on the new container were correct. **Food** The front office staff of a small food processing company were responsible for many tasks and could not always ensure that they were in the office to receive customers and answer phone calls. This meant that urgent inquiries were not always immediately attended to and some customers became irate if they were unfortunate enough to have made several inquiries while the office staff were absent. The company laboratory was adjacent to the reception area and laboratory technicians would attend to customers if they happened to see them waiting. The laboratory technicians realised that they could improve company-customer relations. They organised for a buzzer to be installed that connected the reception desk to the laboratory and the reception phone to redirect to the laboratory if it was not answered within a reasonable period of time. Since they could not always attend to the specific needs of the callers, they developed a standard format for recording messages that were passed back to the reception staff. The laboratory assistants were also trained to receive personal and phone inquires in an appropriate manner. The company found that, even though the laboratory technicians could not always satisfy the immediate demands of customers, the customer satisfaction level was greater when customers

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	were attended to personally than when they were connected to an answering machine or not received at all.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Anti-discrimination Acts
	• Australia New Zealand Food Standards (ANZFS) Code
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• Human Rights and Equal Opportunity Commission Act 1986
	• Therapeutic Goods Regulations 1009
	• customer service and telephone protocols
	• information directories for staff access (personnel and telephone), online databases and CD-ROMs
	• workplace documents, such as:
	  • SOPs and laboratory methods
	  • job (batch) cards and job descriptions
	  • equipment manuals and service logs
	  • induction manuals
	  • supplier catalogues
	  • (daily) production schedules
	  • laboratory schedules

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RANGE STATEMENT	
	• calibration and maintenance schedules • guide to relevant acts and regulations (e.g. Food Standards Code) • material safety data sheets (MSDS) • non-compliance reports • quality manuals • time sheets and logbooks • product specifications • text procedures • shift handover reports • pick lists • hazard analysis and critical control points (HACCP) procedures • libraries • information which uses: • common scientific and technical terminology • symbols, charts, signs, written text, tables, graphs and calculations
Communication	Communication may include interactions with: • supervisors and managers • other laboratory and production personnel • members of the public, customers and clients
Items of equipment	Items of equipment may include: • telephone, two-way radio, PA system, fax and computer (email) • direct display readouts • online information systems
Interpersonal communication	Interpersonal communication includes: • active listening • including others • effective questioning • tolerating the view of others, attempting to reduce conflict and to negotiate suitable outcomes
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise

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RANGE STATEMENT	
	OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Communication/organisation

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL913002A Plan and conduct laboratory/field work

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to plan and complete tasks individually or in a team context. The tasks involve established routines and procedures using allocated resources with access to readily available guidelines and advice. Work plans may need to be modified with supervisor agreement to suit changing conditions and priorities.

Application of the Unit

Application of the unit	This unit of competency is applicable to instrument operators, laboratory assistants and technical assistants working in all industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and organise daily work activities	1.1. Clarify allocated work activities and required resources if necessary 1.2. Prioritise work activities as directed 1.3. Break down work activities into small achievable components and efficient sequences 1.4. Review work plan in response to new information, urgent requests, changed situations or instructions from appropriate personnel 1.5. Update work plan and communicate changes to appropriate personnel
2. Complete allocated work	2.1. Locate relevant workplace procedures for required tasks 2.2. Undertake tasks following prescribed and routine work related sequences 2.3. Seek assistance from relevant personnel when difficulties cannot be handled 2.4. Record completion of activities to confirm outputs in accordance with plan
3. Identify and resolve work problems	3.1. Recognise problems or opportunities for improved work performance

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ELEMENT	PERFORMANCE CRITERIA
	3.2. Apply agreed problem solving strategies to consider possible causes and solutions 3.3. Identify and access appropriate sources of help 3.4. Consider available alternatives and keep them open before agreeing on the most appropriate action
4. Work in a team environment	4.1. Cooperate with team members to negotiate and achieve agreed outcomes, timelines and priorities 4.2. Recognise personal abilities and limitations when undertaking team tasks 4.3. Confirm personal role and responsibility within the team for particular outputs 4.4. Demonstrate sensitivity to the diversity of other team members' backgrounds and beliefs
5. Update knowledge and skills as required	5.1. Recognise own strengths and weaknesses and take advantage of skill development opportunities

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- conducting work based on ethical values and principles
- clarifying tasks and recognising resource needs
- following relevant procedures consistently
- recognising potential disruptions or changed circumstances and modifying work plan in conjunction with relevant personnel
- ability to adjust to a variety of working environments (indoor, outdoor and night)
- seeking assistance from relevant personnel when difficulties arise
- achieving quality outcomes within timelines
- working effectively with team members who may have diverse work styles, cultures and perspectives
- promoting cooperation and good relations in the team
- assisting team members to organise and manage its workload

Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE

Required knowledge includes:
• enterprise procedures:
  • customer service
  • quality
  • occupational health and safety (OHS) and environmental legislative requirements
  • technical work that the candidate routinely performs
• workplace agreements and employment conditions:
  • workers compensation
  • industrial awards enterprise agreements
  • equal employment opportunity
  • anti-discrimination and anti-harassment
• ethical background relevant to the nature of the work:
  • use of animals for research
  • genetic modification, gene therapy, cloning and stem cells
  • invitro fertilisation
  • forensic testing of populations
  • importance of commercial confidentiality
• problem solving strategies
• interpersonal communication and conflict resolution techniques
• relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • follow workplace procedures to achieve quality outcomes within timelines • identify and resolve work problems • work effectively with team members and promote cooperation and good relations

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EVIDENCE GUIDE	
	• prioritise activities and recognise potential disruptions or changed circumstances and modify the work plan in conjunction with relevant personnel.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL913001A Communicate with other people* • *MSL943002A Participate in laboratory/field workplace safety* • technical units related to the tasks undertaken. Resources may include: • enterprise procedures, equipment and materials for relevant technical tasks.
Method of assessment	The following assessment methods are suggested: • review of a flowchart prepared by the candidate to show efficient sequencing of tasks • observation of the candidate performing a range of technical tasks over sufficient time to demonstrate their handling of a variety of contingencies • review of documents detailing completed tasks, such as completed job cards, a report or suggestions for quality improvement • feedback from peers and team members • feedback from supervisors • written or oral questions to partly assess the candidate's ability to handle a range of contingencies and work in a team environment. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like

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EVIDENCE GUIDE	
	environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Manufacturing** A plastic processing plant had to halt production because of a suspect raw material. The plant manager immediately requested the polymer testing laboratory to test and identify all batches of polypropylene additives and colouring agents. The laboratory team of three assistants and one technical officer allocated the workload amongst themselves to conduct the twelve different tests within a period of four hours to identify the 'out of specification' materials and report them to the production supervisor. All laboratory assistants had to reschedule their workplan, perform the required tests and assist each other to solve the production problem. **Biomedical** As part of a routine sequence, a technical officer is required to perform a series of tasks, including the calibration of instruments required for testing of blood samples. These tasks are to be completed within a specified timeframe to meet the output requirements of the enterprise. During the calibration of one of the instruments, the technician experiences difficulties that require expert technical assistance. The problem is referred to the appropriate person and is quickly resolved. Consequently, the officer is able to complete all necessary tasks within the prescribed timeframe and the required output is maintained. **Food processing** Each of the technical assistants working in the laboratory of a food processing company was dedicated to performing specific analyses. As a result, they often alternated between periods of inactivity and excessive workload (the latter case had the potential to compromise their health and safety and the accuracy of their food analyses). One of the contributing factors to the periods of intense activity was the need to quickly prepare standard solutions and reagents. The team discussed this problem and agreed that while it was not appropriate for each assistant to become competent to perform every

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EVIDENCE GUIDE	
	analytical procedure, it was feasible for each person to be able to prepare solutions and reagents used by others. The team developed a central register in which impending shortages of these materials was noted. Each assistant referred to this register when no other work was due and prepared the materials on a 'first in, first out' basis unless a task was given a priority rating. The team found that this strategy more evenly distributed the workload over their shift, improved safety in the laboratory and reduced the risk of error.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards such as:
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	  • AS/NZS ISO 9000 Set:2008 Quality management systems set
	• OHS national standards and codes of practice

Ethical and professional work performance	Ethical and professional work performance includes: • following enterprise policy and procedures, regulations and legislation • behaving honestly and openly

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RANGE STATEMENT	
	• respecting others and treating them with courtesy and impartiality • working diligently and responsibly • ensuring confidentiality of information, including client identification and test results • ensuring proprietary rights, intellectual property and copyright are protected • clarifying personal values and ethics and analysing how they impinge on actions in the workplace
Workplace activities	Workplace activities may include: • setup and pre-use checks of laboratory equipment • calibration status checks • sampling and testing following standard procedures • maintenance and cleaning tasks
Workplace procedures	Workplace procedures may include: • standard operating procedures (SOPs) • job cards, batch cards and production schedules • job descriptions • methods, recipes, procedures and protocols
Problem solving	Problem solving may include: • accessing relevant documentation • identifying inputs and outputs • sequencing a process • identifying and rectifying a problem step • obtaining timely help • implementing preventative strategies wherever possible
Teams	Teams may: • be ongoing with responsibility for particular services or functions • be project based • have a mixture of full and part-time employees and contractors, laboratory, construction and production personnel • be separated by distance and work at sites

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RANGE STATEMENT	
	outside laboratory facilities
Team operation	Team operation may occur within: • small, medium and large contexts • internal and external environments • enterprise guidelines covering access and equity principles and practices, licensing requirements, industrial awards, enterprise bargaining agreements and codes of practice • agreed responsibility and accountability requirements • appropriate goals, objectives • given resource parameters
Team tasks	Team tasks may vary according to: • the size of enterprise • the scope of the laboratory • their level of responsibility
Strategies to maintain work flow	Strategies to maintain work flow may include: • communicating critical events on shift • recognising shortages in reagents and problems with equipment • communicating quality breakdowns • recognising urgent and abnormal results to be processed • communicating and behaving in a courteous manner • being punctual
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and

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RANGE STATEMENT	
	Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Communication/organisation

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL922001A Record and present data

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to record and store data, perform simple calculations of scientific quantities and present information in tables and graphs. The unit of competency requires personnel to solve predictable problems using clear information or known solutions. Where alternatives exist, they are limited or apparent.

Application of the Unit

Application of the unit	This unit of competency is applicable to production operators, field assistants and laboratory assistants working in all industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Record and check data	1.1. Enter data into laboratory information system or record sheets as directed 1.2. Check data to identify transcription errors or atypical entries 1.3. Rectify errors in data using enterprise procedures
2. Calculate simple scientific quantities	2.1. Calculate simple scientific quantities using given formulae and data 2.2. Ensure calculated quantities are consistent with estimations and expectations 2.3. Report all calculated quantities with appropriate precision and units
3. Present data in tables, charts and graphs	3.1. Present data accurately in tables and charts using given formats and scales 3.2. Recognise and report obvious features and trends in data
4. Store and retrieve	4.1. File and store data in accordance with enterprise

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ELEMENT	PERFORMANCE CRITERIA
data	procedures 4.2. Maintain enterprise confidentiality standards

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • performingsimple calculations • preparing and interpreting straightforward tables, graphs and charts • applying calculations in the workplace • coding, recording and checking data accurately • presenting accurate results in the required format • recognising obvious trends in data • maintaining the confidentiality of data in accordance with workplace and regulatory requirements
Required knowledge
Required knowledge includes: • concepts of metrology • the international system of units (SI) • relevant scientific and technical terminology • procedures for coding, entering, storing, retrieving and communicating data • procedures for verifying data and rectifying mistakes • conversion of units involving multiples and submultiples • significant figures, estimation, approximation, rounding off • substitution of data in formulae • calculations involving fractions, decimals, proportions and percentages • procedures for maintaining and filing records, security of data

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • accurately code, check and record data in the required format • calculate simple scientific quantities • recognise obvious trends in data • maintain the confidentiality of data.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit may be assessed with technical units, such as: • *MSL973001A Perform basic tests* • *MSL973002A Prepare working solutions* • *MSL973007A Perform microscopic examination*. Resources may include: • data sets and records • computer and relevant software or laboratory information system • relevant enterprise procedures.
Method of assessment	The following assessment methods are suggested: • review of data worksheets, calculations, graphs and tables prepared by the candidate • review of records transcribed, maintained or stored by the candidate • feedback from supervisors and peers • observation of the candidate as they record data and perform calculations • questions to assess understanding of relevant procedures and trends in data. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and

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EVIDENCE GUIDE	
	disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Construction materials** A laboratory assistant is given 20 soil samples and asked to test their moisture content by weighing each sample, placing them in an oven for 24 hours and then reweighing them. The assistant performs the tests in accordance with the standard method and then calculates the % water content by dividing the weight loss by the wet weight and multiplying by 100. He/she checks the results. After entering them into the laboratory information management system (LIMS), they notice that they are consistently less than the previous results recorded for soils at the same site. The assistant reports the discrepancy to the supervisor who checks whether the oven was operated at the required temperature. The supervisor then discovers that the assistant has calculated the moisture content by dividing the weight loss by the wet weight instead of the dry weight. The assistant recalculates the moisture content for the 20 samples and notes that the results are now consistent with previous results. **Manufacturing** On Friday, a laboratory assistant performs the routine set of temperature, pressure and humidity measurements at 10 sites in a refinery. They enter the data on a pre-prepared data sheet that also contains the data recorded for the previous days of that week. The assistant checks the data for any significant variations to that recorded previously. They notice that for site #5, the temperature reading is 250(C which is 100(C below the expected value. The assistant repeats the measurement and gets the same result. After returning to the laboratory, the assistant enters the data into the LIMS

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EVIDENCE GUIDE	
	and reports the odd result to their supervisor. The supervisor contacts the site manager and finds out that the pipeline at site #5 has been isolated as part of unscheduled maintenance in that part of the site.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • Australian and international standards such as: • AS ISO 1000-1998 The international system of units (SI) and its application • national measurement regulations and guidelines
Concepts of metrology	Concepts of metrology may include: • that all measurements are estimates • measurements belong to a population of measurements of the measured parameters • repeatability • precision • accuracy • significant figures • sources of error • uncertainty • traceability
Data	Data may be recorded on:

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RANGE STATEMENT	
	• worksheets • spreadsheets or databases linked to information management systems Data may include results of: • observations • tests and measurements • surveys Data may be presented in the form of: • graphs • tables • control charts • semi-quantitative observations expressed on a scale (for example, 1 to 4 or + to ++++)
Simple calculations	Simple calculations may be performed with or without a calculator or computer software and may include scientific quantities such as: • decimals, fractions, ratios, proportions and percentages • perimeters, areas, volumes and angles • concentration • unit conversion, multiples and submultiples • use of significant figures, rounding off, estimation and approximation • substitution of data in formulae • conversions between SI units • areas (m^2) and volumes (mL, L, m^3) of regular shapes (e.g. packaging and moulds) • average mass, mass %, density, specific gravity, moisture, relative and absolute humidity • ratios, such as mass to mass, mass to volume and volume to volume percentages • industry specific ratios, such as g/cm^2 , kg/m^2 • concentration (for example, g/100mL, mg/L, mg/(L, dilution mL/L) • statistical values such as mean, median, mode and standard deviation • average count, colonies per swab surface and cell counts (live and dead/total) • process variables, such as pressure, velocity

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RANGE STATEMENT	
	and flow rates • % content of moisture, ash, fat, protein, alcohol, sulphur dioxide and trace metals, such as calcium or zinc • food properties, such as % concentration (dry), friability, bitterness, brix, free amino nitrogen, diastatic power, calorific content and yeast viability
Obvious features and trends in data	Obvious features and trends in data could include: • maximum and minimum values • spread of data • increasing/decreasing data, rate of change • outliers, data beyond control limits or normal range
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Data

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL933001A Maintain the laboratory/field workplace fit for purpose

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the general cleaning of work surfaces, cleaning and storage of equipment and the monitoring of laboratory stocks under direct supervision.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory assistants and instrument operators working in all industry sectors. This unit of competency forms a major part of the work of laboratory assistants. They work in accordance with work instructions and standard operating procedures which incorporate all relevant aspects of occupational health and safety (OHS) legislation and the codes, guidelines, regulations and Australian standards applying to environmental hazards and dangerous goods. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Clean work preparation areas	1.1. Clean preparation areas using appropriate cleaning agents and equipment according to enterprise procedures 1.2. Remove spillages, if they occur, using appropriate agents, personal protective equipment and enterprise procedures 1.3. Collect and segregate wastes in accordance with enterprise procedures, relevant codes and regulations
2. Clean and store equipment	2.1. Collect used equipment, inspect for faults and, where necessary, remove from service 2.2. Use appropriate agents, apparatus and techniques to clean equipment 2.3. Store clean equipment in the designated locations and manner

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ELEMENT	PERFORMANCE CRITERIA
3. Monitor stocks of materials and equipment	3.1. Perform stock checks and maintain records of usage as directed 3.2. Store labelled stocks for safe and efficient retrieval 3.3. Inform appropriate personnel of impending stock shortages to maintain continuity of supply
4. Maintain a safe work environment	4.1. Use established safe work practices and personal protective equipment to ensure personal safety and that of other personnel 4.2. Report potential hazards and/or maintenance issues in own work area to designated personnel 4.3. Minimise the generation of wastes and environmental impacts 4.4. Dispose of wastes in accordance with enterprise procedures, relevant codes and regulations

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- safely cleaning work preparation areas and equipment using appropriate cleaning agents, equipment and techniques
- safely removing spillages and disposing of wastes
- minimising the exposure to hazards of self, others and the laboratory
- safely storing equipment and materials using enterprise procedures, relevant codes and guidelines
- monitoring and reporting stock levels and the condition of laboratory materials and equipment
- keeping accurate, up-to-date records
- reporting potential hazards and maintenance issues using enterprise procedures

Required knowledge

Required knowledge includes:

- enterprise procedures for the cleaning of work preparation areas, materials and equipment

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REQUIRED SKILLS AND KNOWLEDGE
• storage requirements for specific materials and equipment • enterprise procedures for minimisation and disposal of waste • enterprise procedures for monitoring of laboratory stocks • information contained in material safety data sheets (MSDS) for materials handled regularly during the performance of maintenance tasks • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • follow enterprise procedures, relevant codes and guidelines when maintaining the laboratory/field workplace • work safely and minimise exposure of hazards to self, others and the laboratory • keep accurate up-to-date records and report potential hazards and maintenance issues.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL943002A Participate in laboratory/field workplace safety*. Resources may include: • access to work preparation areas, stocks, materials and equipment • cleaning, decontamination and/or disinfection agents and equipment • personal protective equipment • stock order firms, labels and records/forms.
Method of assessment	The following assessment methods are suggested: • observation of the candidate's techniques for cleaning

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EVIDENCE GUIDE	
	and/or removal of spillages and waste disposal • review of stock records completed by the candidate • feedback from supervisors and peers • questioning to assess underpinning knowledge of regulations and procedures where direct observation is difficult (such as dealing with hazards) and choice of materials and equipment. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Manufacturing** On receipt of a bulk container of cleaning or sanitising agent, a laboratory assistant always attached to the container a description of its method of use. The assistant also attached a list of the surfaces, apparatus, utensils and machines that could be safely treated with that chemical agent as outlined in the company's quality manual. This practice reduced the likelihood of misuse of the chemical, wastage, damage to equipment and inadequate cleaning and sanitation. **Biomedical and environmental** Laboratory assistants and technical officers routinely examine fluids for micro-organisms using a microscope. They examine fluids, such as urine, seawater, chlorinated pool water, water from catchment areas and bottled water. To maintain microscopes in working order, they

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	thoroughly clean the stage, oculars and each objective after use and sometimes between samples. The 100X objective requires particular care since this is the oil immersion objective. The oil is slightly acidic and will slowly corrode the objective if it is not cleaned thoroughly and regularly. After using the 100X objective they also take care not to drag the other objectives through the oil. **Food processing** A laboratory assistant regularly uses standard pH solutions to calibrate the laboratory's pH meters. The assistant is aware from the label that the shelf life of these solutions after opening is two months and records the opening and disposal dates on the container. The assistant is also aware that the shelf life of unopened buffer solutions is twelve months from the date of manufacture and monitors this by noting the production date on the bottle. Requests for stock replacement take into account the normal rate of use of these buffer solutions so that unopened bottles have not reached their expiry date before use.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • Australian and international standards such as: • AS 1678 Emergency procedure guide - Transport

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RANGE STATEMENT	
	• AS 1940-2004 Storage and handling of flammable and combustible liquids • AS 2252 Biological safety cabinets • AS 3780-2008 The storage and handling of corrosive substances • AS 4332-2004 The storage and handling of gases in cylinders • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories • AS/NZS 1269 Set:2005 Occupational noise management set • AS/NZS 1337 Eye protection • AS/NZS 2161 Set:2008 Occupational protective gloves set • AS/NZS 2210:1994 Occupational protective footwear • AS/NZS 2243 Set:2006 Safety in laboratories set • AS/NZS 2243.8:2006 Safety in laboratories - Fume cupboards • AS/NZS 2865 Set:2005 Safe working in a confined space set • AS/NZS 2982.1:1997 Laboratory design and construction - General requirements • AS/NZS 4187:2003 Cleaning, disinfecting and sterilising reusable medical and surgical instruments and equipment, and maintenance of associated environments in health care facilities • AS/NZS 4452:1997 The storage and handling of toxic substances • AS/NZS 4501 Set:2008 Occupational clothing set • AS/NZS ISO 14000 Set:2005 Environmental management standards set • animal welfare legislation and codes of practice • Australian code of good manufacturing practice for medicinal products (GMP) • Australian Dangerous Goods Code • Australian Quarantine and Inspection Service (AQIS) Export Control (Orders) Regulations

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RANGE STATEMENT	
	1982 • Australian Quarantine and Inspection Service (AQIS) Import Guidelines • Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Codes of Practice • enterprise or standard operating procedures (SOPs) • equipment manuals and warranties, supplier catalogues and handbooks • gene technology regulations • guide to physical containment levels and facility types • HB 9-1994 Occupational personal protection • material safety data sheets (MSDS) • National Code of Practice for the labelling of workplace substances (NOHSC:2012 (1994)) • national environment protection measures • National Health and Medical Research Council (NHMRC) Guidelines • national measurement regulations and guidelines • occupational health and safety (OHS) national standards and codes of practice • principles of good laboratory practice (GLP) • Therapeutic Goods Regulations 1009
Equipment, **material procedures and facilities**	Equipment, material procedures and facilities may include: • animal cages • autoclaves • balances • blenders, centrifuges and separating equipment • brushes • cell counters and staining machines • colorimeters/spectrometers and polarimeters • compaction rammers and soil classification equipment • conductivity meters and pH meters • dishwashers, refrigerators, freezers, ovens, microwave ovens, incubators and water baths • disintegration apparatus, thermometers and incubators

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RANGE STATEMENT	
	• fume hoods, biohazard containers and biological safety cabinets • gas cylinders • glassware, plastic ware; glass, plastic and quartz cuvettes • hotplates, mantles, burners and muffle furnaces • instrument chart recorders, penetrometers, force measuring equipment and tensiometers • light and fluorescence microscopes • melting point apparatus, viscometers and hardness testing equipment • microtomes and tissue processors • mixing and separating equipment such as centrifuges, rifflers and splitters and mixers • noise meters and blasting meters • optical microscopes • pipettes, burettes and volumetric glassware • shovels, scoops, plates, rods, cylinder moulds and buckets • steel ruler/tapes and spirit levels • thermometers, thermohygrographs, instrument chart recorders, hydrometers, pH meters and ion-selective electrodes • ultrasonic cleaners • vehicles
Typical materials	Typical materials may include: • consumable items, such as syringes, pipette tips, weigh boats • disposable clothing and personal protective equipment • distilled water, reagents, chemicals, disinfectants, detergents, agar media and plates • equipment spares, such as fuses, bulbs and batteries • oils/lubricants, fuels, industrial gases and cryogenics, such as dry ice and liquid nitrogen • paper and stationery • reference samples and standards
Maintenance	Maintenance may include: • checking serviceability before storage • cleaning

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RANGE STATEMENT	
	• prevention of contamination • storing
Cleaning requirements	Cleaning requirements may include: • decontamination and/or disinfection • hygiene monitoring • minimising environmental impacts • operation of automatic cleaning apparatus, such as pipette washer, ultrasonic cleaners and dishwashers • sterilisation and disposal of wastes using boiling, high pressure air or steam, microwaves, chemicals, gas, filtration, ultraviolet radiation and autoclaving • use of specialised techniques, such as chromic acid baths and soaking in hypochlorite
Preparation areas	Preparation areas may include: • benches • fume cupboards • sheds • sinks
Agents for cleaning	Agents for cleaning may include: • cleaning solutions • decontaminants • organic solvents
Spillages	Spillages may include: • chemicals • radioactive materials • biologically active materials
Wastes	Wastes may include: • broken glass • batteries • disposable personal protective equipment • excess test samples • micro-organisms • plastic and metals • sharps • solvents • spent reagents

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RANGE STATEMENT	
	• spent samples and test pieces • used containers, boxes, bags and palettes
Stock records	Stock records may include: • calibration and maintenance history • data sheets • handbooks, warranty documents, catalogues, manuals and MSDS • records of usage, loans and breakages
Communication	Communication could involve other people, such as: • laboratory, production, administration and cleaning staff • internal/external contractors • emergency personnel
Maintenance issues	Maintenance issues could involve: • checking materials and equipment are fit for purpose • equipment malfunction • hygiene issues • potential hazards, incidents and emergencies • recycling and waste disposal • spillages, leakages, breakages and contamination • stock requirements and shortages
Hazards	Hazards may include: • aerosols from broken centrifuge tubes and pipetting • chemicals, such as acids, heavy metals, pesticides and hydrocarbons • crushing, entanglement and cuts associated with moving machinery or falling objects • cryogenics, such as dry ice and liquid nitrogen • electric shock • fluids under pressure, such as steam and industrial gas cylinders • manual handling, working at heights and working in confined spaces • microbiological organisms and agents associated with soil, air, water, blood and blood

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RANGE STATEMENT	
	products, and human or animal tissue and fluids • occupational overuse syndrome, slips, trips and falls • pedestrian and vehicular traffic • sharps, broken glassware and hand tools • solar radiation, dust and noise • sources of ignition, flammable liquids and gases
Established safe work practices	Established safe work practices may include: • applying containment procedures through the use of appropriate equipment, such as biohazard containers, laminar flow cabinets, Class I, II and III biohazard cabinets and Class PCII, PCIII, and PCIV physical containment facilities • ensuring access to service shut-off points • following established manual handling procedures for tasks involving manual handling • handling and storage of all hazardous materials and equipment in accordance with labelling, MSDS and manufacturer's instructions • identifying and reporting operating problems or equipment malfunctions • labelling of samples, reagents, aliquoted samples and hazardous materials • recognising and observing hazard warnings and safety signs • reporting to appropriate personnel of abnormal emissions, discharges and airborne contaminants, such as noise, light, solids, liquids, water/waste water, gases, smoke, vapour, fumes, odour and particulates • use of MSDS • use of personal protective equipment, such as hard hats, hearing protection, gloves, safety glasses, goggles, face guards, coveralls, gown, body suits, respirators and safety boots
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through

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RANGE STATEMENT	
	state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Maintenance

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL933002A Contribute to the achievement of quality objectives

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the development of a working knowledge of quality principles and their application in laboratory/field work.

Application of the Unit

Application of the unit	This unit of competency is applicable to samplers/testers, production operators and laboratory/field assistants working in all industry sectors. These personnel have defined roles and responsibilities within the enterprise's quality system which are set out in quality manuals and workplace procedures. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Apply quality control procedures	1.1. Record data for quality control purposes 1.2. Recognise and report non-conformances in keeping with job role and quality procedures
2. Contribute to quality improvements	2.1. Review own work practices for opportunities to continuously improve performance 2.2. Identify and report opportunities for improvements in procedures, processes and equipment in work area
3. Maintain commitment to enterprise quality standards in own work	3.1. Maintain an objective of 'right first time' 3.2. Conduct work in accordance with sustainable energy work practices 3.3. Minimise waste and rework in accordance with enterprise guidelines 3.4. Demonstrate 'job ownership' for whole tasks through a commitment to finish and follow-up 3.5. Ensure that personal actions conform with the code of ethics relevant to the workplace

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ELEMENT	PERFORMANCE CRITERIA
4. Assist in maintaining customer relationships	4.1. Demonstrate an understanding of the business goals, products and services of the enterprise when dealing with customers in relation to own function 4.2. Communicate appropriately with customers in keeping with knowledge and authority limitations and quality requirements
5. Update knowledge and skills as required	5.1. Recognise own strengths and limitations and take advantage of opportunities for skill development

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- applying the required quality control procedures
- providing quality products and services to customers consistent with the job role
- resolving simple customer requirements
- minimising waste and rework
- contributing to improvements in productivity and quality through teamwork and commitment to personal work standards

Required knowledge

Required knowledge includes:

- concepts of metrology
- continuous improvement and waste minimisation principles
- enterprise procedures associated with the candidate's regular technical duties
- layout of the enterprise, divisions and laboratory
- lines of communication
- organisational structure of the enterprise
- products and services provided by the enterprise
- quality requirements of the candidate's job role and functions
- recording, reporting and document control requirements
- relevant health, safety and environment requirements
- role of internal and external audits
- role of laboratory services to the enterprise and customers

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REQUIRED SKILLS AND KNOWLEDGE
• scheduling of tests and procedures to meet customer requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • apply the required quality control principles and procedures to their work • contribute to improvements in productivity and quality • maintain their personal commitment to quality objectives.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL913001ACommunicate with other people* • technical units of competency dealing with sampling and testing. Resources may include: • enterprise quality manual and procedures • standard operating procedures (SOPs).
Method of assessment	The following assessment methods are suggested: • review of quality control data collected by the candidate • review of quality improvements suggested by the candidate • feedback from supervisors and peers • oral or written questions about quality concepts and enterprise procedures • flow charts or diagrams prepared by the candidate to describe work flows and workplace layout (alternatively, the candidate could explain existing

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EVIDENCE GUIDE	
	charts or diagrams). In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Manufacturing** Laboratory assistants must have a good working knowledge of quality control procedures and how they contribute to the achievement of enterprise quality objectives. An assistant was measuring the moisture content of coke by a standard method. The SOP for this test stated that the limits for moisture should be between 2% and 5% by weight. The assistant obtained a result of 5.8%. The assistant had followed the SOP correctly and performed the determination in triplicate and had confidence in the precision of the result. The assistant recognised and reported the non-conformance to the laboratory supervisor. The production manager took corrective action and modified the drying process to reduce the moisture content and provide a product which met the customer's requirements. **Biomedical** A laboratory assistant working in the pathology department of a rural hospital was responsible for serum lithium estimations by flame photometry. When asked by the office staff when the lithium results would be ready, the assistant replied that the testing schedule of the laboratory meant that the test would not be done until the

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	following week and asked why the office staff needed to know. The answer was that an outpatient clinic was being held, and the results were needed for a consultation. Although samples were often taken a week before the clinic was to be held, the assistant realised that results were not always ready for the clinic because of the testing schedule of the laboratory. The assistant reported the situation to the laboratory supervisor. The supervisor rescheduled lithium testing to match the clinic times, so that results would always be ready for the clinic consultation. This pleased the clinic staff, the patient did not waste a visit, the office staff no longer got irate phone calls and the quality of service was improved overall. **Food processing** A fruit processing company produced many tonnes of solid vegetable waste annually. This was dumped as landfill at considerable cost and the local council was concerned that the method of disposal was not sustainable. The laboratory assistants at the company were included in a quality improvement team to investigate the problem. The team concentrated on alternative production methods to minimise waste yields and additional production methods that would enable the waste to be profitably utilised. They identified four potential uses of the waste: a source of pectin, alcohol and sugar and conversion of raw fruit peel to glazed peel. A cost-benefit analysis was performed in consultation with supporting industries, including a local winery to assess the merits of these value adding activities. The outcome was that the amount of waste produced by the company was significantly reduced with much of the waste channelled into marketable products with full cost recovery. After some initial doubts, the laboratory personnel realised that they were able to make useful contributions to the project. As a result, they became part of an ongoing investigation of waste minimisation and value adding practices.

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS ISO 9000 Set:2008 Quality management systems set
	• Australia New Zealand Food Standards (ANZFS) Code
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• customer specific requirements/standards
	• National Association of Testing Authorities (NATA) Accreditation programs requirements
	• principles of good laboratory practice (GLP)
	• Therapeutic Goods Regulations 1009

Quality control procedures	Quality control procedures may include: • standards imposed by regulatory and licensing bodies • enterprise quality procedures • working to a customer brief and associated quality procedures • checklists to monitor job progress against agreed time, costs and quality standards • the use of hold points to evaluate conformance • the use of inspection and test plans to check compliance
Concepts of metrology	Concepts of metrology may include: • that all measurements are estimates

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RANGE STATEMENT	
	• measurements belong to a population of measurements of the measured parameters • repeatability • precision • accuracy • significant figures • sources of error • uncertainty • traceability
Sustainable energy principles and work practices	Sustainable energy principles and work practices may include: • examining work practices that use excessive electricity • switching off equipment when not in use • regularly cleaning filters • insulating rooms and buildings to reduce energy use • recycling and reusing materials wherever practicable • minimising process waste
Reporting	Reporting may involve: • verbal responses • data entry into laboratory information management system (LIMS) or enterprise databases • brief written reports using enterprise proformas
Quality improvement opportunities	Quality improvement opportunities that relate to the work of laboratory assistants could include: • improved methods for sampling, testing and recording data • improved hygiene and sanitation procedures • minimisation of waste and rework • improved laboratory layout and work flow
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these

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RANGE STATEMENT	
	requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Maintenance

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL933003A Apply critical control point requirements

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to monitor critical, quality and regulatory control points related to a person's work responsibilities. This unit of competency also covers support for ongoing improvement of the enterprise hazard analysis and critical control points (HACCP) plan.

Application of the Unit

Application of the unit	This unit of competency is applicable to production operators and laboratory assistants in the food processing and manufacturing sectors. Control points refer to those key points in a work process that must be monitored and controlled. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Provide routine input to the HACCP plan	1.1. Obtain information about control points in the manufacturing process 1.2. Locate control points for own work area responsibilities 1.3. Perform relevant checks and inspections on materials and equipment to establish conformance to meet food safety requirements 1.4. Identify variations or common faults 1.5. Record inspection results and report to appropriate personnel
2. Contribute to the continuous improvement of the HACCP plan	2.1. Recognise non-conformance to the HACCP plan 2.2. Identify likely causes for non-conformance 2.3. Record and report non-conformances to appropriate personnel

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Required Skills and Knowledge

Required skills
Required skills include: • monitoring of the critical, quality and regulatory control points • preventing contamination from occurring or recurring • recording of information using the enterprise reporting system • collecting and analysing data to identify variation from limits • making approved corrective actions as required • supporting continuous improvement through observation and communication
Required knowledge

Required knowledge includes:
• the seven principles of HACCP and relationship to food or pharmaceutical safety
• preliminary steps for HACCP
• benefits of HACCP
• the HACCP plan, including:
  • the critical control points and control limits
  • consequences of non-conforming products being identified
• continuous improvement practices
• quality policy, procedures and responsibilities
• the methods used to monitor each critical, quality, regulatory control point
• equipment and instrument calibration requirements
• methods for systematically investigating and responding to problems
• control points and their potential impact on work systems
• relevant health, safety and environment requirements
• products and services provided by the enterprise
• layout of the enterprise, divisions, and laboratory
• organisational structure of the enterprise
• lines of communication
• role of laboratory services to the enterprise and customers
• scheduling of tests and procedures to meet customer requirements
• enterprise procedures associated with the candidate's regular technical duties

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • correctly monitor the critical, quality and regulatory control points for their work • prevent contamination from occurring or recurring • collect, record and interpret data and take corrective actions • support continuous improvement through observation and communication.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with • *MSL922001A Record and present data* • *MSL933002A Contribute to the achievement of quality objectives*. Resources may include: • quality manuals and procedures • HACCP plans and records • recording equipment • case studies to illustrate a range of HACCP issues.
Method of assessment	The following assessment methods are suggested: • observation of the candidate monitoring control points in the work area • feedback from supervisors and peers • review of corrective action suggestions by the candidate • flow charts or diagrams prepared by the candidate, alternatively, the candidate could explain existing charts or diagrams • candidate's response to simulated problems. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess

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EVIDENCE GUIDE	
	directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Food processing** The laboratory is responsible for the monitoring of the complex hazard analysis and critical control points in the food production process. The laboratory assistant gathers data at these points for the recording and checking of the process. All data outside the critical limits are immediately communicated to the laboratory manager and the production manager. Any approved corrective actions undertaken by the laboratory assistant are recorded in the laboratory log of system non-conformance. Suggestions for improvement of the system are also recorded for discussion at the regular team meeting.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Codes of practice	Where reference is made to industry codes of practice, and Australian/international standards, it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • Australia New Zealand Food Standards (ANZFS) Code • food safety plans and/or pharmaceutical safety requirements • HACCP plans/documents/procedures • principles of good laboratory practice (GLP) • Australian code of good manufacturing practice for medicinal products (GMP) • product safety plan • production/quality procedures/requirements • quality manuals • standard operating procedures (SOPs) • state/territory/national legislation
Control points	Control points may be: • critical • quality • regulatory
Products/materials handled by laboratory assistants	Products/materials handled by laboratory assistants may include: • raw materials • ingredients • adjuncts/process aids • consumables • finished product • chemicals • food additives
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time

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RANGE STATEMENT	
	• all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Maintenance

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL934001A Contribute to the ongoing development of HACCP plans

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to collect and analyse data obtained from hazard analysis and critical control points (HACCP) records. Personnel are required to implement approved corrective actions and complete the review and update of documents and systems related to HACCP plans.

Application of the Unit

Application of the unit	This unit of competency is applicable to technical assistants working in the food processing, manufacturing and pharmaceutical industry sectors. This unit of competency is relevant to experienced technical officers who may work individually or as part of a team. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Review existing HACCP plans	1.1. Collect data and results from HACCP records 1.2. Identify major and minor non-conformances to the HACCP plan 1.3. Monitor critical control points to confirm performance 1.4. Analyse problem areas using appropriate quality improvement tools and techniques 1.5. Suggest corrective actions and strategies to prevent recurrence of the problem 1.6. Document required amendments to the HACCP plan 1.7. Report and present recommendations to appropriate personnel
2. Provide support for	2.1. Analyse roles, duties and current competency of

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ELEMENT	PERFORMANCE CRITERIA
the implementation of HACCP plans	associated personnel in relation to HACCP responsibilities 2.2. Identify training needs and skill development in relation to the successful implementation of the HACCP plan and assist with delivery 2.3. Maintain resource requirements to support HACCP plan
3. Review the implementation plan	3.1. Implement any approved recommendations 3.2. Update any changes to the documents 3.3. Validate the effectiveness of changes to the HACCP plan

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • reviewing existing HACCP plans • using problem solving techniques to identify causes and options to remedy problems • assessing risk • using quality improvement tools and techniques, including statistical process control • constructing flow diagrams and hazard analysis tables • delivering training to workplace personnel to assist their understanding of their roles and responsibilities for the implementation of HACCP
Required knowledge
Required knowledge includes: • products and services provided by the enterprise • the production process • layout of the enterprise, divisions and laboratory • organisational structure of the enterprise • role of laboratory services to the enterprise and customers • enterprise procedures associated with the candidate's regular technical duties

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REQUIRED SKILLS AND KNOWLEDGE

• scheduling of tests and procedures to meet customer requirements
• equipment and instrument calibration requirements
• the seven principles of HACCP and relationship to food or pharmaceutical safety
• preliminary steps for HACCP
• benefits of HACCP
• the HACCP plan, including:
  • the critical control points and control limits
  • consequences of non-conforming products being identified
• control charts, control limits and control measures
• flow chart symbols
• critical control points and their potential impact on work systems
• microbiological and chemical safety hazards
• the methods used to monitor each critical, quality, regulatory control point
• methods for systematically investigating and responding to problems
• procedures for addressing non-compliance
• communication channels and consultative arrangements
• continuous improvement practices
• quality policy, procedures and responsibilities
• relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • obtain necessary data and results • analyse data and identify corrective action • develop a corrective action plan • monitor and evaluate effectiveness of any changes suggested within the context of the ongoing development of HACCP plan • consult and communicate appropriately with associated personnel • recognise major and minor non-conformances

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EVIDENCE GUIDE	
	• construct flow diagrams and hazard analysis tables • deliver training to workplace personnel to assist their understanding of their roles and responsibilities for the implementation of HACCP • document and present recommendations and changes.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL933002A Contribute to the achievement of quality objectives* • *MSL933003A Apply critical control point requirements* • *TAADEL301C Provide training through instruction and demonstration of work skills*. Resources may include: • access to all appropriate documentation, such as HACCP plan and quality manuals.
Method of assessment	The following assessment methods are suggested: • review of documentation completed by the candidate as part of the development of HACCP plans • review of data and reports obtained from HACCP records by the candidate • feedback obtained from managers on implementation and review of HACCP plans. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study

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EVIDENCE GUIDE	
	below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Food processing** The milk room at a dairy processing plant was receiving continuing high microbiological counts that were approaching levels where they could affect the safety of the final product. The laboratory supervisor began to collect and analyse information obtained from data production records, laboratory results and corrective action reports. From the information obtained, the technician produced graphs to show the microbiological count over the past few weeks. From this information he/she concluded that the contamination was due to the ineffectiveness of a sanitiser. Recommendations were forwarded to the Quality Review Committee and included a review of the: • quality of the sanitising product and an investigation of alternatives • amount of sanitiser ordered to ensure that it was not being stored beyond its recommended use by date • reliability of the suppliers to provide quality products. Following the Quality Review Committee's agreement, the laboratory technician updated the relevant documents and implemented the recommendations. This resulted in the microbiological counts declining to acceptable levels.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards,

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RANGE STATEMENT	
	it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • Australia New Zealand Food Standards (ANZFS) Code • food safety plans and/or pharmaceutical safety requirements • HACCP plans/documents/procedures • principles of good laboratory practice (GLP) • Australian code of good manufacturing practice for medicinal products (GMP) • product safety plan • production/quality procedures/requirements • quality manuals • standard operating procedures (SOPs) • state/territory/national legislation • pharmaceutical standards codes • manufacturers/suppliers specifications • recording sheets • equipment instructions • relevant legislation • equipment operation manuals • standard operating procedures (SOPs) • work instructions • result forms
Software packages	Computer software packages used for the development and implementation of HACCP plans will vary between and within industry sectors
Control points	Control points may be: • critical • quality • regulatory
Products/materials handled by laboratory assistants	Products/materials handled by laboratory assistants may include: • raw materials • ingredients • adjuncts/process aids • consumables

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RANGE STATEMENT	
	• finished product • chemicals • food additives
Members of a HACCP team	Members of a HACCP team may contribute a range of expertise and relevant technical support. They would normally share responsibilities for the development of a HACCP plan
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Maintenance

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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MSL934002A Apply quality system and continuous improvement processes

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the exercise of good laboratory practice and effective participation in quality improvement teams. Personnel are required to ensure the quality and integrity of their own work, detect non-conformances and work with others to suggest improvements in productivity and quality.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory technicians working in all industry sectors who contribute to quality improvements in areas or processes associated with their own job function and/or specialisation. This unit of competency is relevant to experienced technical officers who may work individually or as part of a team. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Satisfy quality system requirements in daily work	1.1. Access information on quality system requirements for own job function 1.2. Record and report quality control data in accordance with quality system 1.3. Follow quality control procedures to ensure products, or data, are of a defined quality as an aid to acceptance or rejection 1.4. Recognise and report non-conformances or problems 1.5. Conduct work in accordance with sustainable energy work practices 1.6. Promote sustainable energy principles and work practices to other workers
2. Analyse opportunities	2.1. Compare current work practices, procedures and

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ELEMENT	PERFORMANCE CRITERIA
for corrective and/or optimisation action	process or equipment performance with requirements and/or historical data or records 2.2. Recognise variances that indicate abnormal or sub-optimal performance 2.3. Collect and/or evaluate batch and/or historical records to determine possible causes for sub-optimal performance 2.4. Use appropriate quality improvement techniques to rank the probabilities of possible causes
3. Recommend corrective and/or optimisation actions	3.1. Analyse causes to predict likely impacts of changes and decide on the appropriate actions 3.2. Identify required changes to standards and procedures and training 3.3. Report recommendations to designated personnel
4. Participate in the implementation of recommended actions	4.1. Implement approved actions and monitor performance following changes to evaluate results 4.2. Implement changes to systems and procedures to eliminate possible causes 4.3. Document outcomes of actions and communicate them to relevant personnel
5. Participate in the development of continuous improvement strategies	5.1. Review all relevant features of work practice to identify possible contributing factors leading to sub-optimal performance 5.2. Identify options for removing or controlling the risk of sub-optimal performance 5.3. Assess the adequacy of current controls, quality methods and systems 5.4. Identify opportunities to continuously improve performance 5.5. Develop recommendations for continual improvements of work practices, methods, procedures and equipment effectiveness 5.6. Consult with appropriate personnel to refine recommendations before implementation of approved improvement strategies 5.7. Document outcomes of strategies and communicate them to relevant personnel

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- applying problem solving techniques and strategies
- applying statistical analysis and statistical sampling procedures
- detecting non-conforming products or services in the work area
- documenting and reporting information about quality
- contributing effectively within a team to recognise and recommend improvements in productivity and quality
- implementing and monitoring improved practices and procedures

Required knowledge

Required knowledge includes:

- specifications for laboratory products and services in the candidate's work area
- quality requirements associated with the individual's job function and/or work area
- scientific and technical knowledge underpinning the processes, procedures, equipment and instrumentation associated with the candidate's work tasks and duties
- workplace procedures associated with the candidate's regular technical duties
- sustainable energy principles
- relevant health, safety and environment requirements
- layout of the enterprise, divisions and laboratory
- organisational structure of the enterprise
- lines of communication
- role of laboratory services to the enterprise and customers

Specific industry

Additional knowledge requirements may apply for different industry sectors. For example:

Biomedical sector:

- ethical requirements dealing with patient confidentiality
- animal welfare legislation and codes of practice
- guidelines for pre-transfusion testing
- gene technology regulations for large scale, small scale and planned release of genetically manipulated organisms

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • use the enterprise's quality systems and business goals as a basis for decision making and action • apply all relevant procedures and regulatory requirements to ensure the quality and integrity of the products/services or data provided • apply and promote sustainable energy principles and work practices • detect non-conforming products or services in the work area • follow enterprise procedures for documenting and reporting information about quality • contribute effectively within a team to recognise and recommend improvements in productivity and quality • apply effective problem solving strategies • implement and monitor improved practices and procedures.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL924001A Process and interpret data* • *MSL954001A Obtain representative samples in accordance with sampling plan* • *relevant MSL974000 series units of competency* • *relevant MSL975000 series units of competency*. Resources may include: • enterprise quality manual and procedures • quality control data/records • customer complaints and rectifications • candidate's supervisors and peers.
Method of assessment	The following assessment methods are suggested: • review of documentation completed by the candidate

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EVIDENCE GUIDE	
	as part of regular quality control • feedback from supervisors and/or customers regarding quality of products/services and/or data regularly provided by the candidate • observation of the candidate's performance and participation in quality improvement teams over time in the workplace • review of reports from quality improvement teams where the candidate's role is clearly outlined and verified • verified reports of improvements suggested and implemented by the candidate individually. Those aspects of competency dealing with improvement processes could be assessed by the use of suitable simulations and/or a pilot plant and/or a range of case studies and scenarios. In all cases, practical assessment should be supported by questions to assess essential knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Manufacturing** A quality improvement team at a chemical manufacturing plant was asked to propose a way of minimising the cost of disposing of chromium rich waste. Using appropriate techniques, the team narrowed the alternatives down to the option of burning the waste stream. An experienced technician agreed that this was feasible, but suggested that because the waste was petroleum high in chromium the team should consider

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	the environmental implications. Subsequent research indicated that the permitted chromium levels in the incinerated air waste stream would not exceed 10 ppm, which was less than the air emission standards for the plant. The technician analysed samples of the air waste stream and determined that the chromium levels were below the regulatory standards. He/she then supported the team's suggestion. **Environmental** The manager of an environmental testing laboratory believed that the team of laboratory technicians relied too much on external direction. As a result, the manager requested that whenever technicians asked for assistance they should also be ready to suggest a solution to the problem if at all possible. This strategy was implemented in a non-threatening manner and was accepted by the team. In time, the manager noted that many of the suggestions for solving problems and improving work practices that came from the team were effective and reasonable. Their skill in making realistic recommendations came from their familiarity with many of the issues that needed to be considered. It became the norm that the laboratory technicians were given public credit for suggesting successful strategies that improved safety, productivity and staff morale. **Food processing** A company that produces apple juice uses 30-35% hydrogen peroxide (H_2O_2) to sterilise packaging. A mist of atomised H_2O_2 is sprayed into pre-formed cartons and later removed with a jet of hot sterile air. The laboratory manager was concerned that some batches of product were not sterile after standing at room temperature for several days. The cause of the failure in the sterilisation procedure was not apparent and a technical officer was asked to investigate this problem. The technical officer examined each unit operation of juice manufacture and determined that the application of H_2O_2 was a critical sterilisation point where failure could occur. The concentration of H_2O_2 in the atomiser and in opened containers was unpredictable and several problems were found to contribute to this. H_2O_2 was left in the atomiser for up to several days between packaging runs. Containers of H_2O_2 were not always used sequentially, some being opened and then not used for a

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	long time. The containers were stored at room temperature after opening and some may have become contaminated with atmospheric particulates that catalyse the breakdown of H_2O_2. The recommendations that emerged from the investigation were that: • fresh H_2O_2 should be used at the beginning of each packaging run • only one stock container of H_2O_2 should be open at any one time and stored chilled, with residuals discarded after 14 days • care should be taken to exclude foreign material from the opened vessels of H_2O_2 and the atomiser. In summary, the intolerance of the company to even low incidences of faulty product and the competency of the technical officer to investigate the processing stream resulted in increased product quality without significant cost.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS ISO 10005:2006 Quality

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RANGE STATEMENT	
	management systems - Guidelines for quality plans • AS/NZS ISO 10012:2004 Measurement management systems - Requirements for measurement processes and measuring equipment • AS/NZS ISO 9000 Set:2008 Quality management systems set • AS 1199 Sampling procedures and tables for inspection by attributes • BS 5750 Quality systems • Australia New Zealand Food Standards (ANZFS) Code • Australian code of good manufacturing practice for medicinal products (GMP) • customer specific requirements/standards • enterprise and customer product specifications • National Association of Testing Authorities (NATA) Accreditation programs requirements • National Health and Medical Research Council (NHMRC) Guidelines • national measurement regulations and guidelines • principles of good laboratory practice (GLP) • quality manuals and procedures • Therapeutic Goods Regulations 1009
Quality control procedures	Quality control procedures may include: • standards imposed by regulatory and licensing bodies • enterprise quality procedures • working to a customer brief or batch card and associated quality procedures • checklists to monitor job progress against agreed time, costs and quality standards • preparation of sampling plans • the use of hold points to evaluate conformance • the use of inspection and test plans to check compliance
Methods for statistical analysis	Methods for statistical analysis may include: • means

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RANGE STATEMENT	
	• median • mode • ranges • standard deviations • statistical sampling procedures
Problem solving techniques	Problem solving techniques may include: • identifying inputs and outputs • sequencing a process • identifying and rectifying a problem step • root cause analysis • implementing preventative strategies
Quality improvement tools and techniques	Quality improvement tools and techniques may include: • run charts, control charts, histograms and scattergrams to present routine quality control data • plan, do, check, act (PDCA) • Ishikawa fishbone diagrams and cause and effect diagrams • logic tree • similarity/difference analysis • Pareto charts and analysis • force field/strength weakness opportunities threats (SWOT) analysis
Sustainable energy principles and work practices	Sustainable energy principles and work practices may include: • examining work practices that use excessive electricity • switching off equipment when not in use • regularly cleaning filters • insulating rooms and buildings to reduce energy use • recycling and reusing materials wherever practicable • minimising process waste
Communication	Communication may involve: • supervisors, managers and quality managers • administrative, laboratory and production personnel

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RANGE STATEMENT	
	• internal/external contractors, customers and suppliers
Reporting	Reporting may include: • verbal responses • data entry into laboratory or enterprise database • brief written reports using enterprise proformas
Quality improvement opportunities	Quality improvement opportunities could include improved: • production processes • hygiene and sanitation procedures • reductions in waste and re-work • laboratory layout and work flow • safety procedures • communication with customers • methods for sampling, testing and recording data
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Maintenance

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL943001A Work safely with instruments that emit ionising radiation

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to safely store, transport and operate instruments that emit ionising radiation following established safe work practices and in accordance with laboratory procedures and licensing requirements. Examples include, use of process control instrumentation, such as fluid level gauges using radioactive sources, on-site non-destructive testing of weldments using X-ray and gamma ray sources and density testing of asphaltic concrete.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory or field assistants working in construction materials testing or similar industry sectors. They work under supervision or direction of paraprofessionals. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Store instruments safely and securely	1.1. Identify state or territory requirements for storage facilities and associated document processes 1.2. Store instruments in accordance with state or territory requirements and documented procedures 1.3. Secure instruments to prevent unauthorised access 1.4. Record instruments' movements and usage in accordance with documented procedures
2. Transport instruments safely and securely	2.1. Select vehicle suitable for the purpose 2.2. Attach regulation signage in accordance with state or territory requirements to indicate that radioactive sources are being carried 2.3. Ensure that instruments are properly located and fixed securely in place

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ELEMENT	PERFORMANCE CRITERIA
	2.4. Ensure security of instruments when the vehicle is unattended
3. Use instruments safely and maintain security	3.1. Follow safe working practices to minimise own exposure to radiation 3.2. Use radiation dosimeter to monitor own exposure to radiation 3.3. Follow safe work practices to minimise exposure of others to radiation 3.4. Follow safe work practices to protect the instrument from damage 3.5. Maintain instrument security
4. Monitor radiation levels	4.1. Check operation and calibration status of radiation survey meter 4.2. Perform radiation survey following documented procedure 4.3. Report atypical conditions and/or problems to appropriate personnel
5. Maintain records	5.1. Record observations, data and results in accordance with enterprise procedures 5.2. Maintain confidentiality of enterprise information
6. Perform emergency procedures	6.1. Identify potential emergency situations 6.2. Respond to emergencies in accordance with documented procedures 6.3. Report emergency situations to appropriate personnel

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • demonstrating emergency procedures • performing and documenting radiation surveys using radiation monitors • using a radiation dosimeter • placing the instrument into storage safely and securely

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REQUIRED SKILLS AND KNOWLEDGE
• transporting the instrument in a motor vehicle safely • safely handling and maintaining the instrument and keeping other personnel clear of radiation sources • observing, interpreting and reporting atypical situations • promptly communicating problems to appropriate personnel
Required knowledge
Required knowledge includes: • health, safety and emergency procedures relevant to radioactive devices • factors affecting radiation intensity • principles of external radiation protection and practical methods of minimising radiation exposure • methods of measuring and detecting ionising radiation • nature of radiation, different types of radiation, their characteristics, sources and shielding methods • physiological effects of ionising radiation • state or territory licensing requirements • national codes of practice • general guidelines for safe handling of radiation sources

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • perform operations in accordance with standards, codes, procedures and enterprise requirements • safely handle, store and transport instruments keeping other people clear of radiation sources • perform and document radiation surveys • recognise, interpret and report problems to appropriate personnel promptly.
Context of and specific resources for	This unit of competency is to be assessed in the

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EVIDENCE GUIDE	
assessment	workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL924001A Process and interpret data* • *MSL943002A Participate in laboratory/field workplace safety* • *MAL974010A Perform mechanical tests*. Resources may include: • appropriate tools, instruments, equipment and materials • enterprise procedures, test methods, equipment and manuals.
Method of assessment	The following assessment methods are suggested: • analysis of work completed by the candidate over a period of time to ensure accuracy, consistency and timeliness • observation of candidate using the instruments in a range of work contexts • review of enterprise documentation completed by the candidate • feedback from peers and supervisors • use of suitable simulation and/or a range of case studies/scenarios. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study below to illustrate the practical application of this unit of competency and show its relevance in a workplace

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EVIDENCE GUIDE	
	setting. **Construction materials testing** Soil moisture density gauges are used extensively for measuring the density of soils, cement treated roadbase, roller compacted concrete and asphalt. They provide a non-destructive means of monitoring compaction operations during construction, so that additional rolling can be provided before the material sets or is covered with another layer. National and state/territory codes of practice regulate the use of equipment that emits ionising radiation. States and territories also have licensing and registration requirements for people involved in owning, storing, transporting or using such equipment. Soil moisture density gauges are used on construction sites, so they are transported to the test site in motor vehicles. They must be protected from damage and stored safely and securely while not in use. The operator must ensure that bystanders are kept clear to minimise radiation exposure. Owners of gauges are required to have documented procedures and ensure that operators are adequately trained. To ensure the safety and integrity of the gauge, radiation surveys are required at regular intervals. A hand-held radiation meter is used, and the results recorded.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:

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RANGE STATEMENT	

	• Australian and international standards, such as:
	  • AS 2243.4-1998 Safety in laboratories - Ionising radiations
	  • AS/NZS 2243.5:2004 Safety in laboratories - Non-ionising radiations - Electromagnetic, sound and ultrasound
	• Australian Dangerous Goods Code
	• Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Codes of Practice
	• calibration and maintenance schedules
	• enterprise recording and reporting procedures
	• equipment manuals
	• equipment startup, operation and shutdown procedures
	• licensing requirements
	• material, production and product specifications
	• National Association of Testing Authorities (NATA) Accreditation programs requirements
	• national environment protection measures
	• National Health and Medical Research Council (NHMRC) Guidelines
	• occupational health and safety (OHS) national standards and codes of practice
	• production and laboratory schedules
	• quality manuals
	• standard operating procedures (SOPs)

Instruments and equipment used	Instruments and equipment used may include: • soil moisture/density gauges • borehole logging probes • fluid density/level detectors • battery chargers • radiation monitors/dosimeters • motor vehicles • storage areas for nuclear sources • documentation, including user manuals and enterprise safety manuals • radiation warning signs
Hazards and problems	Hazards and problems may include: • jamming of the source rod in the exposed position

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RANGE STATEMENT	
	• incidents during transportation • fire • theft of equipment containing radioactive sources • on-site accidents • keeping other personnel clear of instrument • instrument breakdown
Critical elements for radiation safety	Critical elements for radiation safety include: • time (reduce the exposure time) • distance (maintain greatest distance possible at all times) • shielding (interpose as much radiation shielding between yourself and the radiation source as possible)
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Occupational health and safety

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL943002A Participate in laboratory/field workplace safety

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to follow workplace occupational health and safety (OHS) policies and procedures, deal with the identification and control of hazards, work safely at all times, follow emergency response procedures and contribute to the maintenance of workplace safety.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory assistants and instrument operators working in all industry sectors. OHS responses are restricted to a 'first response' approach, including the notification of appropriate enterprise personnel. Workers will be provided with clear directions, information, training and appropriate supervision. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify, control and report OHS and environmental hazards	1.1. Routinely check immediate work area for hazards prior to commencing and during work 1.2. Address hazards within area of responsibility 1.3. Report hazards and incidents to designated personnel according to enterprise policies and procedures
2. Conduct work safely	2.1. Select, fit and use appropriate personal protective clothing and equipment 2.2. Follow enterprise procedures when carrying out work tasks 2.3. Keep all work areas clean and free from obstacles 2.4. Maintain enterprise standards of personal hygiene 2.5. Safely store, transport and dispose of hazardous materials and dangerous goods

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ELEMENT	PERFORMANCE CRITERIA
3. Follow incident and emergency response procedures	3.1. Identify incident and emergency situations 3.2. Report and record incident and emergency situations according to enterprise procedures 3.3. Follow incident and emergency procedures as appropriate to the nature of emergency, using emergency equipment according to enterprise procedures
4. Contribute to OHS in the workplace	4.1. Raise OHS and environmental issues with designated personnel in accordance with enterprise procedures and legislated rights and obligations of employees 4.2. Participate in OHS activities within scope of responsibilities

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- recognising potential incidents and taking appropriate corrective action
- demonstrating workplace fire drill, incident, first aid and emergency evacuation procedures
- hazard identification and risk control, following OHS and environmental policies and procedures
- using, storing and maintaining personal protective equipment
- storing, transporting and disposing of dangerous goods following enterprise instructions and procedures
- using equipment to protect health and safety
- promptly communicating health and safety and environmental issues to designated personnel

Required knowledge

Required knowledge includes:

- roles, rights and responsibilities of self and employer
- signage, symbols and signals relating to OHS
- hazards commonly found in own job and work area and standard risk controls

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REQUIRED SKILLS AND KNOWLEDGE
• location and purpose of personal protective equipment and emergency/hazard control equipment in the work area, including first aid facilities and personnel • use, care and storage requirements for personal protective clothing and equipment used • location of advice and information on OHS issues, including material safety data sheets (MSDS) • requirements and procedures for reporting OHS hazards and incidents, including injuries, illness and near misses • the processes for raising a health and safety issue or concern • safe work practices, including handling, storage and disposal of hazardous substances and requirements for labelling of hazardous substances • work practices for use of handling equipment and any task-specific manual handling techniques as required by work role, according to enterprise procedures • standard operating procedures (SOPs) for equipment used and key safety elements of the procedures • environmental impacts and effects of interaction with hazards in the work area • enterprise procedures and instructions that govern personal work, incidents and emergencies • reporting requirements for OHS issues and potentially hazardous situations • site layout, including emergency exits, location and use of safety alarms, emergency response system, procedures and personnel • enterprise OHS and environmental policies and procedures

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • work safely • recognise potential incidents and hazards and take appropriate corrective action • follow workplace incident, first aid and emergency response procedures • promptly communicate OHS and environmental issues to designated personnel.

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EVIDENCE GUIDE	
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • other relevant technical units of competency. Resources may include: • laboratory/field work environment, equipment and materials • personal protective equipment • enterprise procedures.
Method of assessment	The following assessment methods are suggested: • observation of the candidate preparing for and undertaking a range of work tasks • written and/or oral questioning to assess underpinning knowledge and likely reactions in hazardous/emergency situations • feedback from peers and supervisors • review of candidate's responses to case studies, scenarios and/or 'what ifs'. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Manufacturing** A laboratory assistant working in a laboratory was asked to produce a particular solvent-borne paint. Because of

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EVIDENCE GUIDE	
	the hazardous nature of the task, the assistant referred to the MSDS which specified that a particular respirator and gloves be used. The assistant followed the requirements and safely prepared the batch of paint. **Food processing** One task of a laboratory assistant in a food processing company is the determination of total nitrogen in food samples by the Kjeldahl method. The assay involves digestion of the food with an aliquot of 30% hydrogen peroxide and several other reagents at more than 400°C. The assistant is familiar with the MSDS for hydrogen peroxide and uses this chemical with appropriate caution and personal protective equipment. Small spills of hydrogen peroxide sometimes occur. The assistant knows to clean these up immediately by liberally diluting the spill with water, mopping it up with a cloth and washing the hydrogen peroxide from the cloth into a sink with copious amounts of water. This attention to cleanliness is essential to minimise the risk of injury because 30% hydrogen peroxide has the appearance of water. Unlike water, it is corrosive to skin and presents a serious fire or explosion hazard if it should come into contact with many of the chemicals used in the laboratory. **Biomedical** After performing and verifying cell counts of plated samples, a technical assistant proceeded to dispose of the waste. The wastes were placed in a biohazard bag. The bag was sealed with a sterilisation indicator sticker that was clearly visible, and placed in the autoclave. The assistant checked the colour of the indicator sticker to ensure that the waste was correctly processed before disposing of the bag in accordance with SOPs.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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RANGE STATEMENT	
situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, codes, procedures and/or enterprise requirements	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards such as:
	  • AS 1678 Emergency procedure guide - Transport
	  • AS 1940-2004 Storage and handling of flammable and combustible liquids
	  • AS 2252 Biological safety cabinets
	  • AS 3780-2008 The storage and handling of corrosive substances
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	• AS/NZS 1269 Set:2005 Occupational noise management set
	• AS/NZS 1337 Eye protection
	• AS/NZS 2161 Set:2008 Occupational protective gloves set
	• AS/NZS 2210:1994 Occupational protective footwear
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	• AS/NZS 2982.1:1997 Laboratory design and construction - General requirements
	  • AS/NZS 4452:1997 The storage and handling of toxic substances
	• AS/NZS 4501 Set:2008 Occupational clothing set
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	• HB 9-1994 Occupational personal protection
	• Australian Dangerous Goods Code
	• Australian Quarantine and Inspection Service (AQIS) Import Guidelines
	• Australian Radiation Protection and Nuclear

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RANGE STATEMENT	
	Safety Agency (ARPANSA) Codes of Practice • gene technology regulations • Guide to physical containment levels and facility types • National Code of Practice for the labelling of workplace substances [NOHSC:2012 (1994)] • OHS national standards and codes of practice
Routine checks	Routine checks may include: • general housekeeping checks, such as obstructions which may cause trip hazards • checking of safety equipment, such as eye wash stations • checking reagents and equipment are safe to use • checking availability of emergency equipment • checking functionality of personal protective equipment
Hazards	Hazards may include: • electric shock • microbiological organisms and agents associated with soil, air, water, blood and blood products, and human or animal tissue and fluids • solar radiation, dust and noise • chemicals, such as acids, heavy metals, pesticides and hydrocarbons • aerosols from broken centrifuge tubes and pipetting • radiation, such as alpha, beta, gamma, X-ray and neutron • sharps, broken glassware and hand tools • flammable liquids • cryogenics, such as dry ice and liquid nitrogen • fluids under pressure, such as steam, hydrogen in gas liquid chromatography and acetylene in atomic absorption spectrometry • sources of ignition • high temperature ashing processes • disturbance or interruption of services • occupational overuse syndrome, slips, trips and falls

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RANGE STATEMENT	
	• manual handling, working at heights and working in confined spaces • crushing, entanglement and cuts associated with moving machinery or falling objects • pedestrian and vehicular traffic • vehicle and boat handling

Addressing hazards	Addressing hazards may include:
	• hazard and incident reporting and investigation procedures
	• elimination
	• substitution, such as review of nature of substances or processes used
	• isolation:
	  • use of appropriate equipment, such as biohazard containers, laminar flow cabinets, Class I, II and III biohazard cabinets
	  • Class PCII, PCIII, and PCIV physical containment laboratories
	• engineering
	• administrative procedures, such as:
	  • ensuring access to service shut-off points
	  • recognising and observing hazard warnings and safety signs
	  • labelling of samples, reagents, aliquoted samples and hazardous materials
	  • handling and storage of all hazardous materials and equipment in accordance with labelling, MSDS and manufacturer's instructions
	  • identifying and reporting operating problems or equipment malfunctions
	  • cleaning and decontaminating equipment and work areas regularly using recommended procedures
	  • applying containment procedures
	  • following established manual handling procedures for tasks involving manual handling
	  • use of appropriate equipment and procedures to avoid personal contamination

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RANGE STATEMENT	
	and contamination of others • following risk control measures to minimise environmental hazards • use of practices which minimise waste • reporting to appropriate personnel of abnormal emissions, discharges and airborne contaminants, such as noise, light, solids, liquids, water/waste water, gases, smoke, vapour, fumes, odour and particulates • minimising exposure to radiation, such as lasers, electromagnetic and ultraviolet • use MSDS • use of signage, barriers and service isolation tags • use of personal protective equipment, such as hard hats, hearing protection, sunscreen lotion, gloves, safety glasses, goggles, face guards, coveralls, gown, body suits, respirators and safety boots
Designated personnel	Designated personnel may include: • laboratory manager • supervisor • OHS coordinator • OHS representative
Enterprise policies and procedures	Enterprise policies and procedures may refer to: • OHS specific procedures, such as hazard and incident reporting, communication, consultation and issue resolution and risk management • controlling known hazards • minimising environmental threats • minimising and disposing of waste • responding to safety, emergency, fire and incidents • selecting/using personal protective clothing and equipment
Incidents	Incidents may include: • workplace injury and accidents • cutting, stabbing, puncturing, crushing,

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RANGE STATEMENT	
	immersion in water, suffocation, hypothermia, burns, heat stress, animal bites, allergic reactions and assaults • biological, chemical or radioactive spills, fire, bomb threat, security threat and explosion
Emergency equipment	Emergency equipment may include: • first aid equipment • eye wash kit or shower • fire extinguisher
Participating in OHS activities	Participating in OHS activities may include: • seeking assistance to clarify obligations and procedures • clarifying work instructions that impact on safety and legal liability
OHS and environmental issues which may need to be raised by employees with designated personnel	OHS and environmental issues which may need to be raised by employees with designated personnel may include: • identification of hazards not otherwise addressed • assessment of risk and decisions on measures to control risk • risk reduction measures • problems with implementation of controls • problems with recycling, by-product collection and waste disposal • investigation of injury and incidents • clarification of understanding of OHS policies and procedures
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply

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RANGE STATEMENT	
	current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Occupational health and safety

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL952001A Collect routine site samples

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to collect samples at field or production sites using specified equipment and standard or routine procedures.

Application of the Unit

Application of the unit	This unit of competency is applicable to production operators, field assistants and laboratory assistants in all industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for sampling	1.1. Confirm the purpose, priority and scope of the sampling request 1.2. Liaise with relevant personnel to arrange site access and all necessary clearances/permits 1.3. Identify site hazards and review enterprise safety procedures 1.4. Confirm what samples are to be collected, from where, how and when 1.5. Assemble all specified sampling equipment, safety equipment, materials and containers 1.6. Conduct pre-use and cleanliness checks of all items to ensure they are fit for purpose 1.7. Check all items against given inventory and stow them to ensure safe transport
2. Conduct sampling	2.1. Locate sampling points and services at the site 2.2. Remove security devices, such as locks and covers as required 2.3. Seek advice if the required samples cannot be collected or if procedures require modification 2.4. Select and use required sampling equipment in accordance with given procedures 2.5. Closely follow sampling procedures to obtain required samples and maintain their integrity

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ELEMENT	PERFORMANCE CRITERIA
	2.6. Record all labelling information in accordance with enterprise/legal traceability requirements 2.7. Record sample appearance, environmental conditions and any other factors that may impact on sample integrity 2.8. Replace security devices, such as locks and covers as required
3. Finalise sampling	3.1. Follow enterprise procedures for the cleaning/decontamination of equipment and vehicle as necessary 3.2. Check all equipment, materials and samples against inventory and stow for safe transport 3.3. Liaise with relevant personnel to restore normal production and/or services as necessary 3.4. Maintain integrity of samples during transportation 3.5. Deliver samples to the required collection point and complete all documentation to ensure traceability 3.6. On return, check and document serviceability of equipment before storage
4. Maintain a safe work environment	4.1. Use established work practices and personal protective equipment to ensure personal safety and that of others 4.2. Minimise environmental impacts of sampling and generation of waste 4.3. Dispose of all waste in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • collecting a variety of samples at a range of sites closely following sampling procedures • collecting samples safely with minimal environmental impact • maintaining the integrity and security of samples

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REQUIRED SKILLS AND KNOWLEDGE
• demonstrating enterprise and/or legal traceability requirements • liaising with others to access sites and conduct sampling efficiently • recognising own limitations the seeking timely advice
Required knowledge

Required knowledge includes:
• key terminology and concepts, such as sample, contamination, traceability, integrity and chain of custody
• concepts of metrology
• the international system of units (SI)
• purpose for which the samples have been collected
• the function of key sampling equipment/materials and principles of operation
• hazards, risks and enterprise safety procedures associated with routine sampling undertaken
• enterprise procedures dealing with:
  • sampling
  • waste management, clean up and spillage
  • handling, transport and storage of dangerous goods
• relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • correctly follow sampling procedures and plans when collecting samples • collect samples efficiently, safely and with minimal environmental impact • maintain the integrity and security of samples following the traceability requirements • recognise limitations and seek timely advice.
Context of and specific resources for	This unit of competency is to be assessed in the

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EVIDENCE GUIDE	
assessment	workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL972001AConduct routine site measurements*. Resources may include: • variety of sample types • sampling procedures • a selection of sampling containers, equipment and documentation.
Method of assessment	The following assessment methods are suggested: • review of sampling documentation completed by the candidate • review of the quality of samples collected by the candidate • observation of the candidate collecting a variety of samples at a range of sites • feedback from supervisors and clients that sampling plans were followed • oral/written questioning about sampling and safety procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Construction materials testing** A laboratory assistant takes daily tar samples from the

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EVIDENCE GUIDE	
	company's retort which is used to heat tar to reduce its moisture content. The purpose of this sampling program and subsequent testing is to ensure that the water content of the hot tar is at a safe level before the tar is transferred to a road tanker and used for road construction. Serious accidents can occur during the transfer or use of tar as high water content can cause an explosion due to escape of steam. One day, the retort operator was running behind schedule and tried to convince the laboratory assistant that the water content of the tar was the same as yesterday and didn't need to be tested. The laboratory assistant was able to explain that a high water content could lead to a serious explosion and burns for the operator. **Environmental** A new field assistant was collecting samples of environmental run-off during wet weather. To successfully complete the activity, the assistant made sure that they included a sample thief, pipette, or similar to extract the sample, a container with a secure lid, and an indelible marker to write on the label. In addition, the assistant remembered to take sealable, waterproof plastic bags in which to put the containers once the samples were collected and a spare bag to protect the field notebook from rain damage. **Manufacturing** A production operator has been given the task of collecting samples of the recent batches of blended products, prior to drumming and customer delivery. In addition, the operator is required to sample the bulk raw materials stored on-site, and the drummed blend ingredients, including some powdered pigments. The operator knows that the lab needs the blend samples first and after putting on chemical gloves and safety glasses, accesses each sample point on each of the blend tanks. Because the products are under pressure in the tank manifold, it is important to guard against splashes. Some of the products are flammable hydrocarbons, so the operator ensures that static leads are connected from the tank to the sample vessel during pouring. To sample the drummed product, a sample thief is used and again, safety glasses and chemical gloves are important. The pigments present a dust hazard when being sampled, so the operator applies a protective mask over their nose and

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EVIDENCE GUIDE	
	mouth, to prevent ingestion while they use a small purpose-built shovel to empty the contents into the sample container.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS ISO 1000-1998 The international system of units (SI) and its application
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	  • AS/NZS ISO 9000 Set:2008 Quality management systems set
	• calibration and maintenance schedules
	• enterprise recording and reporting procedures
	• enterprise sampling procedures for specific samples, sites and clients
	• environmental legislation and regulations
	• equipment manuals
	• equipment startup, operation and shutdown procedures
	• industry codes of practice
	• maps and site plans

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RANGE STATEMENT	
	• material safety data sheets (MSDS) • material, production and product specifications • National Association of Testing Authorities (NATA) documents regarding construction materials testing • national measurement regulations and guidelines • occupational health and safety (OHS) national standards and codes of practice • quality manuals • safety procedures • standard operating procedures (SOPs)
Site hazards	Site hazards may include: • solar radiation, dust and noise • wildlife, such as snakes, spiders and domestic animals • biohazards, such as micro-organisms and agents associated with soil, air and water • chemicals, such as acids and hydrocarbons • sharps and broken glassware • manual/handling of heavy sample bags and containers • crushing, entanglement and cuts associated with moving machinery and hand tools • falling objects, uneven surfaces, heights, slopes, wet surfaces, trenches and confined spaces • vehicle handling in rough terrain and boat handling in rough or flowing water
Safety procedures	Safety procedures may include: • use of MSDS • use of personal protective equipment, such as hard hats, heavy protection, gloves, safety glasses, goggles, faceguards, coveralls, gowns, body suits, respirators and safety boots • correct labelling of hazardous materials • handling and storing hazardous material and equipment in accordance with labels, MSDS, manufacturer's instructions and enterprise procedures and regulations • regular cleaning and/or decontamination of

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RANGE STATEMENT	
	equipment • machinery guards • signage, barriers, service isolation tags, traffic control and flashing lights • lockout and tag-out procedures
Types of samples	Types of samples may include: • grab samples • disturbed or undisturbed materials • composite samples, such as time, flow proportioned and horizontal/vertical cross section • quality control samples, such as controls, background, duplicate and blanks
Materials sampled	Materials sampled may include: • gas or air samples • water, wastewater, stormwater, sewage and sludge • soils • construction materials • solid wastes, such as commercial, industrial and mining • raw materials, start, middle, end of production run samples and final products for a wide range of manufactured items, including food and beverages • hazardous materials and/or dangerous goods
Sampling tools and equipment	Sampling tools and equipment may include: • front-end loader, backhoe, excavator and drill rig • shovels, augers and bucket • sampling frames, sampling tubes, dip tubes, spears, flexible bladders and syringes • access valves • sample thief • weighted sample bottles, bottles, plastic/metal containers and disposable buckets • sterile containers, pipettes, inoculating loops and disposable spoons • pumps and stainless steel bailers

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RANGE STATEMENT	
Maintenance of integrity of samples	Maintenance of integrity of samples could include: • appropriate containers and lids (e.g. glass, plastic, amber and opaque) • sealing of sample containers • purging of sample lines and bores • decontamination of sampling tools between collection of consecutive samples • use of appropriate preservatives (e.g. sodium azide, toluene or antibiotics) • wrapping container in foil or wet newspaper • temperature control, which may involve prevention of direct contact between the sample and coolant • transfer of sterile sample into sterile container • monitoring of storage conditions • enterprise/legal traceability through appropriate sample labelling and records
Services	Services may include: • water supply, gas and electricity • telecommunications • irrigation, stormwater and drainage systems • production plant
Minimising environmental impacts	Minimising environmental impacts may involve: • replacement of soils and vegetation • driving to minimise soil erosion and damage to fauna and vegetation • disposal of surplus, spent or purged materials • recycling of non-hazardous wastes • appropriate disposal of hazardous waste • cleaning of vehicles to prevent transfer of pests and contaminants
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time

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RANGE STATEMENT	
	• all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Sampling

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL952002A Handle and transport samples or equipment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to pick up and transport samples or test/calibration equipment in a way which ensures the integrity of subsequent test results.

Application of the Unit

Application of the unit	This unit of competency is applicable to couriers and laboratory and field assistants in all industry sectors. The person transporting the items is not necessarily responsible for sampling or testing. This unit does not cover sample collection or the ability to handle and transport animals as might be defined under prevailing animal care and ethics legislation and practices. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for pickup	1.1. Confirm pickup sequence and any licence/permit requirements with supervisor 1.2. Check that vehicle and communication devices are in working order 1.3. Check that required transport containers and materials are in the vehicle
2. Pick up and transport items	2.1. Confirm the number and nature of items to be picked up on arrival 2.2. Ensure items match paperwork 2.3. Apply enterprise requirements to the transport of samples and/or equipment 2.4. Alert laboratory personnel to any special needs that are identified on documents accompanying the items 2.5. Complete required documentation at pickup point 2.6. Stow items in the specified transport containers and under the required conditions

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ELEMENT	PERFORMANCE CRITERIA
	2.7. Maintain sample integrity at all times 2.8. Deliver items to reception point in accordance with enterprise procedures 2.9. Maintain confidentiality of information
3. Maintain transport equipment	3.1. Maintain vehicle according to enterprise requirements 3.2. Maintain state of transport containers to ensure they are fit for purpose 3.3. Requisition stocks of consumable materials as required 3.4. Replenish stocks of collecting equipment at collection centres as required
4. Maintain a safe work environment	4.1. Use established work practices and personal protective equipment to ensure personal safety and that of others 4.2. Clean up spills, if they occur, using enterprise procedures 4.3. Minimise the generation of waste 4.4. Dispose of all waste in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- planning the picking up of items in conjunction with a supervisor
- preparing a vehicle for the required journey
- using communication devices so contact is possible between the courier, reception centre, and routine pickup locations
- communicating effectively and courteously with individuals, customers, clients and reception staff
- recording details of item exchange in relevant sections of chain of custody forms, as required
- maintaining the integrity of collected samples or equipment during transport
- containing and cleaning up spillage or breakages

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REQUIRED SKILLS AND KNOWLEDGE
• using appropriate techniques and equipment to safely dispose of waste materials • maintaining confidentiality in all aspects of work • reporting of problems, accidents or incidents in accordance with enterprise procedures
Required knowledge
Required knowledge includes: • the relationship between effective communication with clients and customers and enterprise business • the need for appropriate and timely transport • control measures for minimising exposure to hazardous materials and equipment • effect of changes in environmental conditions, vibration and shock on samples • procedures for the containment and cleanup of spillages and breakages • efficient waste containment and disposal practices • maintenance requirements of equipment used in the processes of handling and transporting samples • relevant health, safety and environment requirements • enterprise procedures for responding to emergencies • contact details for key personnel **Specific industry** Additional knowledge requirements may apply for different industry sectors. For example:Biomedical samples: • labile nature of biological and environmental samples • possible infectivity of biological materials • possible effects of exposure to radioactive materials

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • follow required policies and procedures to maintain the integrity of collected samples or equipment

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EVIDENCE GUIDE	
	during transport • deal with customers effectively and courteously • work safely • maintain confidentiality and report problems, accidents and incidents in accordance with procedures.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL943002A Participate in laboratory/field workplace safety*. Resources may include: • vehicle • enterprise procedures for the handling and transport of samples or equipment • communication devices • sample containers • containers for transporting samples and test/calibration equipment.
Method of assessment	The following assessment methods are suggested: • review of the job sheets or journal of completed activities • direct observation of work as a courier • the quality of review of results traceable to the transport of samples or equipment by candidate • oral or written questions to assess knowledge of the handling of unforseen circumstances • simulated role plays between a courier and personnel at a reception desk or customer pickup centre. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required.

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	The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Calibration** Calibration laboratories must take special care to ensure that they do not damage test equipment during handling, testing or storage. Information relating to equipment requiring special handling, transport or storage conditions should be provided to those responsible for collecting and transporting the items. A customer-orientated calibration laboratory offers a door to door calibration service to most of its clients. Once a week their driver arrives at a major facility and takes delivery of several precision measuring instruments. As always, the driver signs the acceptance note paying particular attention that all the items are recorded correctly, including listing all accessories and associated handbooks. But this time, two delicate items require unique transit cases to ensure they are stored and transported upright. Because the laboratory received prior notice, these cases were loaded into the van before setting off as well as a copy of the special transport and packaging instructions. The driver secures all the items in accordance with the accompanied written instructions to ensure their safe travel and minimise damage during transit. Upon return, the driver unloads the van and the instruments are acquitted by administration staff, inspected for damage and booked into the laboratory. The lab supervisor makes sure that their technicians are aware of the special handling requirements of the two delicate instruments. **Biotechnology** During transit, samples must be handled and maintained under conditions which will ensure that their potency and efficacy are maintained. A courier has been asked to transport vaccine samples from the airport to the enterprise for laboratory evaluation. The supervisor faxes the courier company detailed instructions regarding

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	pickup and handling/storage conditions during transit. In this case, the samples are in insulated containers and the temperature is monitored and recorded continuously. The courier collects the samples, puts them in the coolest part of the vehicle, ensuring that the package will not be subject to any sudden jolts, and transports them to the enterprise. After the samples arrive they are checked by the enterprise and appropriate documentation completed. **Biomedical** At 8 am the courier commences the day shift. The shift supervisor identifies the collection centres to be visited. The courier takes the mobile phone from the charger and checks their pager. In the vehicle, the courier logs in the odometer reading, makes a mental note of the fuel level, checks the cooler boxes and other equipment and carefully drives out. Today, there are pickups from four private hospitals and 12 collecting centres in a 200 sq km zone. As they approach the first hospital, there is a call from base with instructions to collect a tissue biopsy and bring it back immediately. He/she asks the base contact to tell haematology that their 10 am specimen arrival will be 40 minutes late because of this unforseen diversion. Eventually, they complete the round, having remembered to replenish specimen collecting stock at each centre visited. **Environmental (1)** A technical assistant regularly handles and transports sensitive equipment over rough terrain in a 4WD vehicle. After reaching a field site, they are asked to transport expensive water monitoring equipment across an estuary in a small aluminium boat. The assistant notes that the equipment boxes are open to the weather and will need to be made waterproof. Because the water is choppy, the assistant adds extra packing material to cushion the most shock sensitive items. They choose to travel with the equipment rather than entrusting it to the local fisherman. Together, they carefully secure the items on the seats rather than placing them on the floor of the boat which is wet. **Environmental (2)** A waste management authority has sent one of their laboratory technicians to collect six containers that have been found by a member of the public on the verge of an industrial area service road. Given that the materials may

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	be hazardous the technician assembles a full set of safety equipment. They also locate a laptop computer with MSDS information, a list of phone contacts for agencies responsible for handling hazardous materials and suitable containers for storing/transporting potentially hazardous materials. Upon arrival at the site, the technician locates six containers of concentrated sulphuric acid which are clearly labelled. The technician consults the MSDS for information on appropriate handling, storage and transportation procedures and follows them closely.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • Australian and international standards such as: • AS 1678 Emergency procedure guide -Transport • AS 1940-2004 Storage and handling of flammable and combustible liquids • AS 4332-2004 The storage and handling of gases in cylinders • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories • AS/NZS 2243 Set:2006 Safety in laboratories set • AS/NZS 4452:1997 The storage and handling of toxic substances

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RANGE STATEMENT	
	• AS/NZS ISO 14000 Set:2005 Environmental management standards set • animal welfare legislation and codes of practice • Australia Post Guides • Australian Dangerous Goods Code • Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Codes of Practice • International Air Transport Association (IATA) Regulations • material safety data sheets (MSDS) • occupational health and safety (OHS) national standards and codes of practice
Paperwork and documentation	Paperwork and documentation may include: • enterprise protocols regarding customer liaison and communication • vehicle log books • protocols for use of pagers, mobile telephones and two-way radios • precautions for safe handling and handling of specific materials (e.g. toxic, infective, radioactive and dangerous goods) • precautions for the transport of volatile and unstable fluids • incident/accident report forms • spillage and waste containment and disposal protocols and containment materials
Maintenance of the integrity of samples or test/calibration equipment	Maintenance of the integrity of samples or test/calibration equipment could involve: • use of appropriate sample containers (glass, plastic and opaque) • use of appropriate preservatives • wrapping container in foil to exclude light • temperature control, which may involve prevention of direct contact between the sample and coolant • use of appropriate equipment boxes (insulated, shockproof and waterproof) • restraint of containers to prevent movement • checking sample viability during transport while avoiding unnecessary handling

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RANGE STATEMENT	
Hazards	Hazards may include: • biohazards, such as micro-organisms and agents associated with soil, air, water, blood and blood products, and human or animal tissue and fluids • chemicals, such as acids and hydrocarbons • sharps and broken glassware • manual handling of heavy sample bags and containers and equipment
Safety practices	Safety practices may include: • use of MSDS • use personal protective equipment, such as gloves, safety glasses, goggles and coveralls • use of biohazard containers • safe road/off road driving practices • correct labelling of hazardous materials • handling and storing hazardous material and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning and/or decontaminating of equipment and vehicle
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Unit sector	Sampling

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL953001A Receive and prepare samples for testing

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to log samples, check sample documentation, schedule and prepare samples for testing in accordance with enterprise procedures. This unit does not include testing, tissue processing or similar techniques.

Application of the Unit

Application of the unit	This unit of competency is applicable to field and laboratory assistants in all industry sectors who receive and prepare samples as part/all of their jobs in a sample reception area. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Log samples	1.1. Record date (and time of arrival, if required) of samples at enterprise 1.2. Check and match samples with request forms before they are accepted 1.3. Enter samples into the laboratory information management system (LIMS) 1.4. Apply required document tracking mechanisms 1.5. Process 'urgent' test requests according to enterprise requirements 1.6. Ensure security and traceability of all information, laboratory data and records
2. Address customer service issues	2.1. Report to referring client when samples and request forms do not comply with enterprise requirements 2.2. Refer to supervisor for instruction where 'return to source' is inappropriate or not possible 2.3. Maintain confidentiality of all client/enterprise data

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ELEMENT	PERFORMANCE CRITERIA
	and information 2.4. Ensure that information provided to customers is accurate, relevant and authorised for release 2.5. Deal with customers politely and efficiently and in accordance with enterprise procedures
3. Prepare samples for testing	3.1. Perform physical separation of the samples, as required 3.2. Prepare the required number of sub-samples 3.3. Perform chemical separation of the samples as required 3.4. Place samples in appropriate transport media, if appropriate 3.5. Monitor and control sample conditions before, during and after processing
4. Distribute samples	4.1. Group samples requiring similar testing requirements 4.2. Distribute samples to work stations maintaining sample integrity 4.3. Distribute request forms for data entry or filing in accordance with enterprise procedures 4.4. Check that samples and relevant request forms have been received by laboratory personnel
5. Maintain a safe work area and environment	5.1. Apply safe work practices to ensure personal safety and that of other laboratory personnel 5.2. Use appropriate protective equipment to ensure personal safety when sampling, processing, transferring or disposing of samples 5.3. Report all accidents and spillages to supervisor 5.4. Clean up splashes and spillages immediately using appropriate techniques and precautions 5.5. Minimise the generation of wastes and environmental impacts 5.6. Ensure the safe disposal of hazardous materials and other laboratory wastes

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- receipt and logging in of samples
- checking of samples for history and acceptable transport conditions
- preparing and sub-sampling of samples
- labelling samples accurately and completely
- using standard precautions when dealing with potentially hazardous materials
- applying knowledge of the relationship between specific sample preparation and associated tests
- clarifying specific client requirements with appropriate personnel promptly
- labelling and storing samples in a way which maintains sample integrity and traceability
- disposing of samples following required procedures
- maintaining equipment and the workspace

Required knowledge

Required knowledge includes:

- enterprise procedures for the receipt, documentation, distribution and storage of samples
- potentially hazardous and unstable nature of samples
- requirement of specified sample types for specific tests
- importance of maintaining effective customer relations
- sample storage and transport requirements
- relevant health, safety and environment requirements

Specific industry

Additional knowledge requirements may apply for different industry sectors. For example:Biomedical laboratories:

- potentially infective nature of all biological materials
- nature of unstable solutions, such as anti-coagulated whole blood
- non-conformance of clotted samples for procedures, such as routine haematological tests

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • safely receive and log samples in accordance with enterprise procedures • apply knowledge of the relationship between sample preparation requirements and associated tests • deal with customers politely and efficiently • recognise and deal with problems according to enterprise procedures • maintain sample integrity and traceability.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL913001A Communicate with other people* • *MSL943002A Participate in laboratory/field workplace safety*. Resources may include: • a selection of sample containers, tubes, request forms and sample documentation • simulated samples when an authentic sample is unavailable or inappropriate.
Method of assessment	The following assessment methods are suggested: • review of sample receipt and preparation records prepared by the candidate • feedback from supervisors and peers • direct observation of sample receipt and preparation • questioning to assess knowledge of procedures where direct observation is difficult (such as sample receipt and preparation in the field). In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to

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EVIDENCE GUIDE	
	accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Environmental** A laboratory assistant at a hazardous liquid waste recycling plant is required to log in all samples, match all samples with the in-house profile of the source of the waste, label them and activate the tracking procedure. He/she then prepares a sample for a series of standard tests which are determined by the profile of the waste material (acid or alkali, organic or heavy metal, etc). Given the hazardous nature of the waste, the laboratory assistant must use appropriate safety equipment at all times and ensure the safe disposal of all hazardous material. The assistant must work efficiently as these procedures are activated upon arrival of a road tanker and when the hazardous waste has been verified and judged acceptable for treatment at the plant by the laboratory supervisor. The laboratory assistant also liaises with the truck driver, or the referring client, should the samples (and/or subsequent tests) not comply with enterprise conditions for receiving the hazardous waste. **Construction materials testing and mineral assay** A laboratory assistant has received a consignment of disturbed soil samples from a client for classification testing. A test request and field logs have been sent by mail. Each sample is bagged and labelled, with the label showing the name of the client, project, date and sampling location, and a field description of the material. The laboratory policy is that samples weighing more than 20 kg must be bagged so that the individual bags do not exceed this limit and labelled as bag 1 of ..., bag 2 of ..., etc. The assistant checks to ensure all component bags of such samples are present. He/she is careful to handle the

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EVIDENCE GUIDE	
	samples using safe manual handling techniques. The assistant arranges the samples in order of location and reconciles them with the test request and logs. Two samples have been shown on the request but have not been received. The assistant emails the technician who despatched them and subsequently is advised that they were overlooked during despatch and will be forwarded as soon as possible. The assistant compares the samples with the field descriptions and finds that they match. Samples that are not designated for testing immediately are set aside in the laboratory store. The remainder are placed in trays for drying in the 50ºC oven. The tray numbers are carefully written on the respective worksheets. When the samples have dried and cooled they are split out sufficiently for sieve analysis and plasticity testing, making allowance for the maximum particle size of each sample. The assistant is careful to avoid raising dust during the process. **Biomedical** A laboratory assistant has just started a shift in specimen reception and puts on a coat and gloves before touching any samples. There is a pile of samples and forms in the sample box. In some cases, the samples and forms are enclosed in a plastic bag. In other cases, they are seemingly unconnected. The assistant notices that one of the samples has a bloodstained label. She/he quickly examines the samples, isolates the leaking sample in a lockable plastic bag and places the related request form in the bag's separate compartment. The assistant then disposes of her/his dirty gloves. The assistant now logs all samples into the computer, placing to one side a sample and request form that is inadequately labelled. She/he makes a note to call the referring doctor as soon as possible. The assistant places the haematology samples in the colour-coded tray and calls the laboratory for their pickup. She/he then calls the doctor of the patient whose sample is inadequately labelled. She/he records the missing date of birth on the request form, and then barcode/labels tubes for the samples' testing. Within 30 minutes, she/he has cleared the first rush of samples. She/he takes the time to carefully empty the bin of wastes.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards such as:
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	• Australia Post Guides
	• Australian Dangerous Goods Code
	• Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Codes of Practice
	• enterprise operating procedures for preparing samples
	• enterprise quality manuals
	• gene technology regulations
	• International Air Transport Association (IATA) Regulations
	• material safety data sheets (MSDS)
	• occupational health and safety (OHS) national standards and codes of practice
	• procedure sheets for physical and chemical separation
	• procedure sheets indicating how samples and sub-samples are to be labelled, processed, distributed, flagged for urgent testing or for other non-routine requirements, including

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RANGE STATEMENT	
	referral to external laboratories • procedure sheets indicating transport and storage requirements • safety manuals describing personal protective equipment requirements, control of hazardous wastes, containment and cleanup of spillages, and disposal and recycling of wastes
Samples received	Samples received may include: • gas or air samples • liquid samples, such as water and waste water, stormwater, sludges and complex mixtures and sewage • solid samples, such as soils and sediments, rocks/minerals, concrete, quarry or mining products • solid wastes, such as hazardous, non-hazardous, domestic, commercial, industrial, mining and agricultural • biological specimens such as tissue and blood • raw materials, start, middle, end of production run samples and final products
Hazards	Hazards may include: • biohazards, such as micro-organisms and agents associated with soil, air, water, blood and blood products, and human or animal tissue and fluids • dust and noise • chemicals, such as acids and hydrocarbons • aerosols • sharps and broken glassware • manual handling of heavy sample bags and containers • crushing, entanglement and cuts associated with moving machinery
Safe work practices	Safe work practices may include: • use of MSDS • use of personal protective equipment, such as hard hats, hearing protection, gloves, safety glasses, goggles, face guards, coveralls, gowns, body suits, respirators and safety boots • use of biohazard containers and laminar flow

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RANGE STATEMENT	
	cabinets • correct labelling of reagents and hazardous materials • handling, and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning and/or decontamination of equipment and work areas
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Sampling

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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MSL954001A Obtain representative samples in accordance with sampling plan

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to obtain a range of samples that are representative of the source material (e.g. raw ingredients, product in process and final product) and to prepare the samples for testing. All sampling activities are conducted in accordance with a defined sampling plan. This unit does not cover the subsequent testing of the samples.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory technicians in all industry sectors. It involves: • a range of sampling plans, samples and sampling procedures, which apply to the enterprise site, plant laboratory or field sites • enterprise products/materials and hazardous materials • a range of sampling points and/locations. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for sampling	1.1. Confirm the sampling location, number and type of samples, and timing and frequency of sampling from enterprise or client's sampling plan 1.2. Liaise with relevant personnel to arrange site access and, if appropriate, all necessary clearances and/or permits 1.3. Select sampling equipment and conditions to achieve representative samples and preserve sample integrity during collection, storage and transit 1.4. Check that all procedures are in accordance with client or enterprise requirements, relevant standards and codes 1.5. Identify site and sampling hazards and review enterprise safety procedures

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ELEMENT	PERFORMANCE CRITERIA
	1.6. Assemble and check all sampling equipment, materials, containers and safety equipment 1.7. Arrange suitable transport to, from and around site as required
2. Conduct sampling and log samples	2.1. Locate sampling sites and, if required, services at the site 2.2. Conduct representative sampling in accordance with sampling plan and defined procedures 2.3. Record all information and label samples in accordance with traceability requirements 2.4. Record environment or production conditions and any atypical observations made during sampling that may impact on sample representativeness or integrity 2.5. Transport all samples back to base according to standard operating procedures (SOPs) and relevant codes
3. Prepare samples for testing	3.1. Prepare sub-samples and back-up sub-samples that are representative of the source 3.2. Label all sub-samples to ensure traceability and store in accordance with SOPs 3.3. Follow defined preparation and safety procedures to limit hazard or contamination to samples, self, work area and environment 3.4. Distribute sub-samples to defined work stations maintaining sample integrity and traceability requirements
4. Address client issues	4.1. Enter approved information into laboratory information management system (LIMS) 4.2. Report all relevant aspects of the sampling and preparation phases in accordance with enterprise procedures 4.3. Ensure that information provided to client is accurate, relevant and authorised for release 4.4. Maintain security and confidentiality of all client/enterprise data and information
5. Maintain a safe work environment	5.1. Clean all equipment, containers, work area and vehicles according to enterprise procedures 5.2. Check serviceability of all equipment before storage 5.3. Use defined safe work practices and personal protective equipment to ensure personal safety and that of other laboratory personnel

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ELEMENT	PERFORMANCE CRITERIA
	5.4. Minimise the generation of wastes and environment impacts 5.5. Ensure the safe collection of all hazardous wastes for appropriate disposal

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • collecting representative samples in accordance with a sampling plan • techniques to preserve the integrity of samples • identifying atypical materials and samples and taking appropriate action • maintaining sampling equipment • completing sampling records • working safely • following requirements for the disposal of waste and the preservation of the environment
Required knowledge
Required knowledge includes: • principles of representative samples • principles and procedures for random, systematic and stratified sampling, consistency of sampling procedures • preservation of the integrity of samples • maintaining identification of samples relative to their source • enterprise and/or legal traceability requirements • cost effectiveness of sampling • characteristics of product/material to be sampled and likely contaminants • links between quality control, quality assurance, quality management systems and sampling procedures • enterprise procedures dealing with legislative requirements for the handling, labelling and transport of hazardous goods • links between correct occupational health and safety (OHS) procedures and personal and environmental safety particularly at high risk sites

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REQUIRED SKILLS AND KNOWLEDGE
Specific industry Additional knowledge requirements may apply for different industry sectors. For example:Biomedical and environmental services: • specific legislation on biohazards • documentation procedures for the chain of custody for samples to be used as evidence or for blood transfusion

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • collect the specified quantity of sample to enable all processing and testing to occur and back-up samples to be stored • obtain a sample that is representative of the bulk material • preserve the integrity of samples by closely adhering to procedures • label samples and sub-samples to satisfy enterprise/legal traceability requirements • identify atypical materials and samples and take appropriate action • maintain sampling equipment in appropriate condition • complete sampling records using enterprise procedures • follow safety regulations and enterprise OHS procedures during sampling, transport and storage • follow relevant legislative requirements for the disposal of waste and the preservation of the environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment.

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EVIDENCE GUIDE	
	This unit of competency may be assessed with: • *MSL924001A Process and interpret data* • *MSL943002A Participate in laboratory/field workplace safety* • *relevant MSAL974000 series units of competency* • *relevant MSAL975000 series units of competency relevant to the sampling*. Resources may include: • variety of sample types • sampling plans • a selection of sampling containers and sampling equipment.
Method of assessment	The following assessment methods are suggested: • inspection of samples collected by the candidate • review of sampling documentation completed by the candidate • feedback from peers, customers and supervisors that sampling plans were followed • questioning to assess underpinning knowledge of representative sampling procedures • observation of the candidate taking a range of samples. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace

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EVIDENCE GUIDE	
	setting. **Manufacturing** A metallurgical laboratory technician is very familiar with preparing representative samples for a range of final products in a steelmaking plant. One day, he/she is asked to sample a 50 tonne small-particle coal delivery which is believed to have a higher than acceptable sulphur content. Having never prepared representative samples for such a large quantity of material, the technician consulted their supervisor and developed an appropriate sampling plan. The technician arranged for the operator of a small front-end loader to take buckets of coal from five equally spaced points around the pile. The resulting material was then combined and mixed in one heap. The technician coned and quartered the heap enough times to obtain a representative sample of about 5kg. He/she arranged for the unwanted material to be returned to the stockpile. On return to the laboratory, the technician crushed the sample and repeatedly coned and quartered the material to obtain an analytical portion. **Environmental** A field technician trained in sampling natural water systems is asked to sample a bright yellow industrial wastewater discharge into a small creek. The relevant sampling plan specifies that the samples should be collected where the waste water is well mixed near the centre of the creek and at the mid-depth point. The technician also notes that the samples must be collected where turbulence is at a maximum so that the settling of solids is minimal. On arrival at the site, the technician locates where the wastewater is entering the creek. He/she moves downstream to where the waste water and creek water is well mixed and there is little apparent loss of the yellow suspended solids. The technician dons the required personal protective equipment and uses a convenient bridge to collect a set of six samples and duplicates over a half-hour period using the equipment and procedures specified in the sampling plan. Using a field notebook, the technician records all information specified in the laboratory's chain of custody requirements and safety plan for handling potentially hazardous industrial waste.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS 1199 Sampling procedures and tables for inspection by attributes
	  • AS 1678 Emergency procedure guide -Transport
	  • AS 1940-2004 Storage and handling of flammable and combustible liquids
	  • AS 3780-2008 The storage and handling of corrosive substances
	  • AS 4433.2-1997 Guide to the sampling of particulate materials - Preparation of samples
	  • AS/NZS 4452:1997 The storage and handling of toxic substances
	• American Association of Cereal Chemists (AACC) Approved Methods of Analysis
	• Australian Dangerous Goods Code
	• enterprise and/or client sampling schemes and sampling plans
	• enterprise recording and reporting procedures
	• gene technology regulations
	• material safety data sheets (MSDS)
	• methods and procedures which may be written to meet enterprise, client and/or regulatory/certifying body requirements
	• National Code of Practice for the labelling of workplace substances [NOHSC:2012 (1994)]
	• site plans, maps and specifications

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RANGE STATEMENT	
Basic principles of sampling	Basic principles of sampling include: • representative samples • preservation of integrity of samples • maintaining identification of samples relative to their source, enterprise and legal traceability • cost-effectiveness of sampling • consistency of sampling procedures • sampling principles, including random, systematic and stratified sampling
Materials sampled	Materials sampled may include: • gas or air samples • liquid samples, such as water, groundwater, waste water, stormwater, sludges and sewage • solid samples, such as soil, sediments, rocks, concrete, quarry and mining material • solid wastes • raw materials, start, middle, end of production run samples, final products and materials used in production processes, such as flocculants • plants • animals • microbiological samples
Types of samples	Types of samples may include: • grab samples • composite samples • quality control samples • research or one-off samples • environmental or survey samples
Sampling tools and equipment	Sampling tools and equipment may include: • shovels, augers and chain saws • sampling frames, sampling tubes, dip tubes, spears, flexible bladders and syringes • front-end loader, backhoe, excavator and drill rig • sample bottles or containers, plastic containers and disposable buckets • access valves • sample thief • auto samplers

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RANGE STATEMENT	
	• pumps and stainless steel bailers • traps and cages • sterile containers, pipettes, inoculating loops and disposable spoons
Maintenance of integrity of samples	Maintenance of integrity of samples may include: • use of compatible container, such as glass, plastic, amber and opaque bottles • use of appropriate preservatives, such as sodium azide, toluene or antibiotics • decontamination of sampling tools between collection of consecutive samples • wrapping container in foil • purging of sample lines and boxes • handling and transport to avoid disturbance or damage • temperature control which may involve insulation of sample without direct contact with the coolant • wrapping in wet newspaper, cloth, sand or sawdust • transfer of sterile sample into sterile container • monitoring of storage conditions
Site and sampling hazards	Site and sampling hazards may include: • solar radiation, dust and noise • wildlife, such as snakes, spiders and domestic animals • biohazards, such as micro-organisms and agents associated with soil, air, water, blood and blood products, and human or animal tissue and fluids • chemicals, such as acids and hydrocarbons • aerosols • sharps and broken glassware • manual handling of heavy sample bags and containers • crushing, entanglement and cuts associated with moving machinery and hand tools • vehicular and pedestrian traffic
Safety procedures	Safety procedures may include: • use of MSDS

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RANGE STATEMENT	
	• use of personal protective equipment, such as hard hats, hearing protection, gloves, safety glasses, goggles, face guards, coveralls, gowns, body suits, respirators and safety boots • use of biohazard containers and laminar flow cabinets • correct labelling of reagents and hazardous materials • handling, and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning and/or decontaminating equipment and work areas • machinery guards • signage, barriers, service isolation tags, traffic control and flashing lights • lockout and tag-out procedures
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Sampling

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL963001A Operate basic handblowing equipment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to operate handblowing equipment to perform basic glasswork. Personnel may be less experienced workers working under the guidance of an experienced scientific glassblower.

Application of the Unit

Application of the unit	This unit of competency is applicable to personnel working with experienced scientific glassblowers, generally in scientific educational institutions. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for handblowing operations	1.1. Identify job, appropriate procedure, hazards and safety requirements 1.2. Use personal protective equipment and safety procedures specified for the job and materials to be used 1.3. Record description of the job to be undertaken, compare with specification and report any variations 1.4. Select and prepare tools and equipment in accordance with job requirements 1.5. Identify glass stocks and components required for the job
2. Follow sequence of operations for glasswork procedure to be performed	2.1. Prepare glass stocks and components as required for the job 2.2. Check and adjust equipment and tools for the job as applicable 2.3. Start up equipment using enterprise procedures 2.4. Carry out glasswork procedure using the appropriate standard method 2.5. Monitor process and rectify routine problems 2.6. Follow equipment shutdown procedures

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ELEMENT	PERFORMANCE CRITERIA
3. Use annealing equipment	3.1. Prepare annealing equipment for the job 3.2. Start up, operate and shut down annealing equipment using enterprise procedures 3.3. Monitor, adjust and record annealing operation 3.4. Rectify routine problems
4. Maintain a safe work environment	4.1. Follow established work practices to ensure safety of self and other workers 4.2. Minimise the generation of wastes 4.3. Ensure the safe disposal of wastes 4.4. Clean, care for and maintain work area, equipment and tools 4.5. Report any hazards or incidents according to enterprise procedures
5. Maintain records	5.1. Record data as per enterprise requirements 5.2. Maintain equipment logs as per enterprise requirements 5.3. Maintain security and confidentiality of enterprise information

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- working safely with glass
- using tools and equipment to perform basic glassblowing operations
- using appropriate glassblowing hand manipulation techniques
- cutting, heating, bending, shaping, sealing and related glassworking techniques
- techniques for minimising strain
- using coefficients of expansion
- maintaining safe working pressures
- storing glass appropriately
- making and grinding components, such as stopcocks than meet specifications
- starting up, setting up, shutting down and maintaining equipment in accordance with work instructions

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REQUIRED SKILLS AND KNOWLEDGE
• selecting appropriate grades of glass and preparation for use • optimising of equipment operating parameters • maintaining temperature and stress parameters • reporting atypical results and problems to appropriate personnel according to enterprise procedures • recording and communicating of work results • following correct occupational health and safety (OHS) and principles of good laboratory practice (GLP)
Required knowledge
Required knowledge includes: • composition and nature of glass types • function and correct use of apparatus • basic chemical and physical concepts relating to properties and behaviour of glass • safe startup and shutdown procedures • critical material properties and appropriate glassworking parameters • pre-heating procedures • basic theory of re-entry angles and stress points • setup and annealing/conditioning process • relationship of temperature and temporary and permanent stress • pre-annealing, annealing and post-annealing processes • potential quality problems • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • use basic bench/hand glasswork techniques and equipment to fabricate general glass apparatus • start up, set up and shut down equipment in accordance with work instructions • report atypical results and problems to appropriate

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EVIDENCE GUIDE	
	personnel.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. Resources may include: • access to a scientific glassblowing facility, appropriate equipment, materials and procedures • a bank of case studies is required where these form part of the assessment method.
Method of assessment	It is strongly recommended that assessment is conducted through observation over time. The timeframe must allow for adequate assessment of operation under all normal and a range of abnormal conditions. Where this is not practical additional assessment techniques must be used. The following assessment methods are suggested: • inspection of glasswork and workplace documentation completed by the candidate • analysis of work outputs over a period of time to ensure accurate and consistent work is obtained within required timelines • feedback from peers and supervisors • use of suitable simulation and/or a range of case studies/scenarios. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study below to illustrate the practical application of this unit of

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EVIDENCE GUIDE	
	competency and show its relevance in a workplace setting. **Education** A trainee glassblower has been requested by her/his supervisor to make 100 Pasteur pipettes for a university chemistry practical class the next day. The trainee selects the appropriate glass and type and cuts 50 lengths of glass (two pipettes per length). She/he then proceeds to pull points at the designated markings in the centre of the glass tube using the bench burner. At the conclusion of this operation, the pipettes are cut to the relevant length and then flared at the other end using a specially profiled carbon hand tool. The pipettes are then annealed to eliminate stress caused by the manufacture process. After inspection through a polariscope, the pipettes are delivered to the laboratory for use.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • calibration and maintenance schedules • enterprise recording and reporting procedures • equipment manuals • equipment startup, operation and shutdown procedures • industry codes of practice • material safety data sheets (MSDS)

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RANGE STATEMENT	
	• material, production and product specifications • National Environment Protection Measures • OHS national standards and codes of practice • production and laboratory schedules • quality manuals • standard operating procedures (SOPs)
Tools and equipment	Tools and equipment may include: • bench burner, hand torch, micro torch and ribbon burner, gas supplies and gas economiser • dydinium glasses and polariscope • glassworking lathe • annealing oven • measuring and recording equipment • hand tools, such as carbon paddles and mandrels, range of forceps, glass tubing gauges, angle setting jigs, calipers, glass support rollers, brass shapers, carbon rods, glass knife, stainless steel gauze, vernier calipers and other measuring tools, and strain viewer • mechanical glass cutters and saws • mechanical glass grinding equipment • communication equipment
Quality problems	Quality problems may include: • temperature and strain problems • devitrification • non-uniform thickness of seals or joints • equipment problems • quality problems, such as poor optics, distortion, excessive breakage, non-uniform break pattern, incorrect cross bend, excessive bow, scratches and poor glass shape • loss of utilities
Hazards	Hazards may include: • sharps and broken glassware • heat sources, such as burners and ovens • fluids under pressure (acetylene and oxygen) • glass dust • cuts associated with glass grinders and cutters • manual handling of heavy sample bags and

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RANGE STATEMENT	
	containers
Safe work practices	Safe work practices may include: • use of personal protective equipment, such as heat resistant gloves, safety glasses, goggles, face guards, coveralls, respirators and safety boots • correct labelling of reagents and hazardous materials • handling, and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning and/or decontamination of equipment and work areas
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Scientific glassblowing

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL963002A Repair glass apparatus using simple glassblowing equipment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to perform basic repairs to glass apparatus using simple glassblowing equipment. It includes the ability to assess the economics of salvage and to follow a procedure of disassembly/assembly of the apparatus in accordance with specifications.

Application of the Unit

Application of the unit	This unit of competency is applicable to scientific glassblowers. It covers work that will sometimes be performed by less experienced workers under the guidance of an experienced scientific glassblower. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		
	MSL963001A	*Operate basic handblowing equipment*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for repair operations	1.1. Identify job, appropriate procedure, hazards and safety requirements, and apparatus required 1.2. Establish correct cleaning procedure for contaminated glassware before commencing repair operations 1.3. Use personal protective equipment and safety procedures as specified for job and materials to be used 1.4. Record job description, compare with blueprint, drawing, sketch, design or similar specification and report perceived difficulties 1.5. Prepare equipment for repair in accordance with job requirements 1.6. Identify, select and prepare glass stocks and

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ELEMENT	PERFORMANCE CRITERIA
	components for job
2. Repair apparatus	2.1. Check and adjust equipment and tools for job requirements 2.2. Check and adjust equipment and tools for the job 2.3. Start up equipment using enterprise procedures 2.4. Follow supplied designs and enterprise procedures to perform the repairs required 2.5. Follow equipment shutdown procedures
3. Operate annealing equipment	3.1. Prepare annealing equipment for the job 3.2. Start up, operate and shut down annealing equipment using enterprise procedures 3.3. Monitor, adjust and record annealing operation 3.4. Rectify routine problems
4. Maintain a safe work environment	4.1. Follow established safe work practices to ensure safety of self and other workers 4.2. Minimise the generation of wastes 4.3. Ensure the safe disposal of wastes 4.4. Clean, care for and maintain work area, equipment and tools 4.5. Report hazards and incidents according to enterprise procedures
5. Maintain records	5.1. Record data as per enterprise requirements 5.2. Maintain equipment logs as per enterprise requirements 5.3. Maintain security and confidentiality of enterprise information

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • determining types of contaminants present on/in apparatus • cleaning techniques for contamination carried out before repair operations are

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REQUIRED SKILLS AND KNOWLEDGE
undertaken • using appropriate treatment processes, with particular attention to risks associated with blowing used and possibly contaminated glass • reading and following blueprints, drawings, sketches and designs relevant to repair work • selecting appropriate grades of glass and preparing for use • preparing apparatus for repair • optimising and using glassblowing equipment • identifying atypical or out of normal repair problems • reporting problems to either supervisor or outside service technician according to enterprise procedures • recording and communicating work results • following correct occupational health and safety (OHS) and principles of good laboratory practice (GLP)
Required knowledge
Required knowledge includes: • relevant glassblowing techniques • the risks associated with blowing used and contaminated glass • contamination cleaning techniques to be carried out before repair operations are undertaken • use and function of the broken apparatus • repair materials and reason for their choice • use of appropriate tools and equipment • basic chemical and physical concepts related to behaviour of glass under heat and stress • basic knowledge of how apparatus to be repaired is used • critical material properties and appropriate glassworking parameters • pre-repair apparatus preparation procedures • annealing procedures • methods of minimising potential quality problems • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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EVIDENCE GUIDE	
Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • safely repair glass apparatus following enterprise procedures • assess the economics of salvage • follow a procedure of disassembly/assembly of apparatus in accordance with specifications • apply contamination cleaning techniques before repair operations are undertaken • report problems to appropriate personnel.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL963001AOperate basic handblowing equipment*. Resources may include: • access to a scientific glassblowing facility, appropriate equipment, materials and procedures • a bank of case studies where these form part of the assessment method.
Method of assessment	It is strongly recommended that assessment is conducted through observation over time. The timeframe must allow for adequate assessment of operation under all normal and a range of abnormal conditions. Where this is not practical additional assessment techniques must be used. The following assessment methods are suggested: • inspection of glasswork and workplace documentation completed by the candidate • analysis of work completed over a period of time to ensure accurate and consistent work is obtained within required timelines. • feedback from peers and supervisors • use of suitable simulation and/or a range of case studies/scenarios. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess

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EVIDENCE GUIDE	
	directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Education** A trainee glassblower has been asked by his/her supervisor to repair several pieces of used and broken laboratory glassware as part of a cost saving exercise. Firstly, he/she determines whether the glassware will be used for general tasks or for qualitative analysis and how urgently the job is required. He/she then clarifies whether any hazardous material has been used in the equipment and applies the correct cleaning procedures. After determining the nature of the glass and the appropriate glassworking parameters, he/she repairs the equipment using safe apparatus. Finally the glassblower subjects the equipment to the appropriate annealing/conditioning process and checks the final outcome with his/her supervisor. Any contaminated or used glass waste is disposed of appropriately.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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RANGE STATEMENT	
situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • calibration and maintenance schedules • enterprise recording and reporting procedures • equipment manuals • equipment startup, operation and shutdown procedures • industry codes of practice • material safety data sheets (MSDS) • material, production and product specifications • national environment protection measures • OHS national standards and codes of practice • production and laboratory schedules • quality manuals • standard operating procedures (SOPs)
Tools, **materials and equipment**	Tools, materials and equipment may include: • burners, gas supplies and gas economisers • glassworking lathes • mechanical glass cutters and saws • mechanical glass grinding equipment • annealing ovens • measuring and recording equipment • hand tools, such as carbon paddles and mandrels, range of forceps, glass tubing gauges, angle setting jigs, calipers, glass support rollers, brass shapers, carbon rods, glass knife, stainless steel gauze, vernier calipers and other measuring tools, and strain viewer • various glass types, including soda-lime, borosilicate, quartz, silica and special formula glasses • glass to metal seals • communication equipment

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RANGE STATEMENT	
Hazards	Hazards may include: • sharps and broken glassware • heat sources, such as burners and ovens • fluids under pressure (acetylene and oxygen) • glass dust • cuts associated with glass grinders and cutters • manual handling of heavy sample bags and containers
Safe work practices	Safe work practices may include: • use of personal protective equipment, such as heat resistant gloves, safety glasses, goggles, face guards, coveralls, respirators and safety boots • correct labelling of reagents and hazardous materials • handling, and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning and/or decontamination of equipment and work areas
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Unit sector	Scientific glassblowing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL973001A Perform basic tests

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to perform tests and measurements using standard methods with access to readily available advice from supervisors.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory/field assistants working in all industry sectors. In general, they do not calibrate equipment and make only limited adjustments to the controls. They do not interpret or analyse results or troubleshoot equipment problems. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Interpret test requirements	1.1. Review test request to identify samples to be tested, test method and equipment involved 1.2. Identify hazards and enterprise controls associated with the sample, preparation methods, reagents and/or equipment
2. Prepare sample	2.1. Record sample description, compare with specification, record and report discrepancies 2.2. Prepare sample in accordance with appropriate standard methods
3. Check equipment before use	3.1. Set up test equipment in accordance with test method 3.2. Perform pre-use and safety checks in accordance with enterprise procedures and manufacturer's instructions 3.3. Identify faulty or unsafe equipment and report to appropriate personnel 3.4. Check calibration status of equipment and report any out of calibration items to appropriate personnel
4. Perform tests on samples	4.1. Identify, prepare and weigh or measure sample and standards to be tested

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ELEMENT	PERFORMANCE CRITERIA
	4.2. Conduct tests in accordance with enterprise procedures 4.3. Record data in accordance with enterprise procedures 4.4. Perform calculations on data as required 4.5. Identify and report out of specification or atypical results promptly to appropriate personnel 4.6. Shut down equipment in accordance with operating procedures
5. Maintain a safe work environment	5.1. Use established safe work practices and personal protective equipment to ensure personal safety and that of other laboratory personnel 5.2. Minimise the generation of wastes and environmental impacts 5.3. Ensure safe disposal of laboratory and hazardous wastes 5.4. Clean, care for and store equipment and reagents as required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- interpreting enterprise procedure or standard methods accurately
- using safety information, such as material safety data sheets (MSDS) and performing procedures safely
- checking test equipment before use
- completing all tests within required timeline without sacrificing safety, accuracy or quality
- calculating, recording and presenting results accurately and legibly
- maintaining security, integrity and traceability of all samples, data/results and documentation
- cleaning and maintaining equipment

Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge includes: • concepts of metrology • the international system of units (SI) • purpose of test • principles of the standard method • pre-use equipment checks • relevant standards/specifications and their interpretation • sources of uncertainty in measurement and methods for control • enterprise and/or legal traceability requirements • interpretation and recording of test result, including simple calculations • procedures for recognition/reporting of unexpected or unusual results • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • accurately interpret enterprise procedures or standard methods • complete all tests within the required timeline without sacrificing safety, accuracy or quality • demonstrate close attention to the accuracy and precision of measurements and the data obtained • maintain the security, integrity and traceability of all samples, data/results and documentation.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL922001A Record and present data*. Resources may include: • standard laboratory equipped with appropriate

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	equipment standards and materials • enterprise procedures and standard methods, and equipment manuals • MSDS.
Method of assessment	The following assessment methods are suggested: • review of the quality of test data/results achieved by the candidate over time • inspection of records and workplace documentation completed by the candidate • feedback from peers and supervisors • observation of the candidate performing a range of basic tests • oral or written questioning to check underpinning knowledge of test procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Manufacturing** Standard testing methods may be viewed as legal requirements that must be followed to ensure that a product manufactured in a chemical plant meets the specification by which it is sold to the customer. Technical assistants perform tests in a quality control laboratory to ensure that material meets legal requirements and the material is safe and effective in use. Peroxides may be present in ether as a result of

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	light-catalysed air oxidation. Peroxides are toxic and can give rise to mixtures which are explosive when distilled. Technical assistants test ether to ensure that the level of peroxide is within acceptable limits. The test is done by shaking ether with a solution of potassium iodide. After standing for 30 minutes in the dark the yellow colour of the aqueous phase, due to the liberation of iodine, must not be more intense than a prepared standard solution. These tests ensure the quality and safety of the ether. **Food processing** A snack food company produces a range of high quality, impulse purchase snack foods. Some of these products are moisture and/or oxygen sensitive and are therefore packaged in multi-layer flexible packaging to provide optimum shelflife. The packaging must also be able to withstand the rigours of the production and distribution process. While the packaging is purchased to meet the shelflife and distribution specifications, the quality assurance program requires the periodic evaluation of the packaging materials against these specifications. A laboratory assistant uses standard methods to test the tearing resistance, bursting strength, impact resistance and permeability and/or leakage of the snack food packaging. Tests are also conducted on aspects of the manufacturing process that can affect shelflife. These tests involve the measuring of the heat-seam strength and the sealing performance of the closure process. The test results are recorded by the laboratory assistant to verify the conformance of the materials to the supplier specifications and of the process to the manufacturing specifications. The assistant reports any anomalies or non-conformances to the appropriate personnel. **Construction materials testing** A technician performs an Aggregate Stripping Test (AS 1141.50) and enters the results in the laboratory's information management system (LIMS). The resulting 20-30% stripped values (i.e. 70-80% adhering) indicate a 'fail' result. The technician notes that he has repeated the test and obtained the same 'fail' result. The laboratory manager reviews the results and asks the technician to explain how he performed the test. He describes how he prepared 3-4 mm thick plates of bitumen and binding agent in the mould and then placed 50 small clean pieces of aggregate on top. After treatment in an oven for 24

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	hours and a 50°C water bath in accordance with the test method, the technician had then carefully pulled out the pieces of aggregate and avoiding any twisting motion. He then estimated the % of bitumen adhering to each of the stones with the expectation that the stripped value would be about 5% (i.e. 95% adhering). The manager is satisfied that the technician has performed the test in accordance with the method and suggested that he now re-run the test with a known aggregate as a control. This test gives a stripped value of 5-7% (i.e. 93-95% adhering). The manager is now sufficiently confident of the laboratory's results to sign and issue the test report and explain the aggregate's 'test failure' to the client.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS ISO 1000-1998 The international system of units (SI) and its application
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• calibration and maintenance schedules

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RANGE STATEMENT	
	• enterprise recording and reporting procedures • equipment manuals • equipment startup, operation and shutdown procedures • MSDS and safety procedures • material, production and product specifications • national measurement regulations and guidelines • principles of good laboratory practice (GLP) • production and laboratory schedules • quality manuals • standard operating procedures (SOPs)
Concepts of metrology	Concepts of metrology may include: • that all measurements are estimates • measurements belong to a population of measurements of the measured parameters • repeatability • precision • accuracy • significant figures • sources of error • uncertainty • traceability
Preparation of samples	Preparation of samples may include: • sub-sampling or splitting using procedures, such as riffling, coning and quartering, manual and mechanical splitters • diluting samples • physical treatments, such as ashing, dissolving, filtration, sieving, centrifugation and comminution • moulding, casting or cutting specimens
Typical tests carried out by laboratory/field assistants	Typical tests carried out by laboratory/field assistants may include: • visual/optical tests of appearance, colour, texture, identity, turbidity, refractive index (alcohol content and Baume/Brix) • physical tests: • density, specific gravity and compacted

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RANGE STATEMENT	
	density • moisture content and water activity • particle size, particle shape and size distribution • chemical tests: • gravimetric • colorimetric • electrical conductivity (EC) and pH • specific ions using dipsticks and kits • nutrients (e.g. nitrates and orthophosphates) using basic kits • ashes, including sulphated ashes • biological/environmental tests: • pH, oxygen reduction potential (ORP), dissolved oxygen (DO) and (EC) • E coli using test kits • surface hygiene/presence of microbes • packaging tests: • tearing resistance, bursting strength and impact resistance • permeability and/or leakage • mechanical tests: • Emerson class • concrete slump
Measurements	Measurements may include: • simple ground surveys • meteorological parameters, such as wind direction/strength, rainfall, maximum/minimum temperature, humidity and solar radiation • simple background radiation survey • production/process parameters, such as temperature, flow and pressure • gas levels in a confined space
Common measuring equipment	Common measuring equipment may include: • dimension apparatus • DO and EC • analogue and digital meters and charts/recorders

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RANGE STATEMENT	
	• basic chemical and biological test kits • dipsticks and site test kits (e.g. HACK) • timing devices • temperature measuring devices, such as thermometers and thermocouples
Hazards	Hazards may include: • electric shock • biohazards, such as microbiological organisms and agents associated with soil, air, water, blood and blood products, and human or animal tissue and fluids • solar radiation, dust and noise • chemicals, such as sulphuric acid, fluorides and hydrocarbons • aerosols • sharps, broken glassware and hand tools • flammable liquids • dry ice and liquid nitrogen • fluids under pressure • sources of ignition • occupational overuse syndrome, slips, trips and falls • manual handling, working at heights and working in confined spaces • crushing, entanglement and cuts associated with moving machinery or falling objects
Enterprise controls to address hazards	Enterprise controls to address hazards may include: • use of MSDS • use of signage, barriers and service isolation tags • use of personal protective equipment, such as hard hats, hearing protection, sunscreen lotion, gloves, safety glasses, goggles, face guards, coveralls, gowns, body suits, respirators and safety boots • use of appropriate equipment, such as biohazard containers and cabinets and laminar flow cabinets • recognising and observing hazard warnings and safety signs

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RANGE STATEMENT	
	• labelling of samples, reagents, aliquoted samples and hazardous materials • handling and storage of all hazardous materials and equipment in accordance with labelling, MSDS and manufacturer's instructions, and enterprise procedures and regulations • cleaning and decontaminating equipment and work areas regularly using recommended procedures • following established manual handling procedures for tasks involving manual handling
Minimising environmental impacts	Minimising environmental impacts may involve: • recycling of non-hazardous waste, such as chemicals, batteries, plastic, metals and glass • appropriate disposal of hazardous waste • correct disposal of excess sample/test material • correct storage and handling of hazardous chemicals
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL973002A Prepare working solutions

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to prepare working solutions and to check that existing stocks are suitable for use. Calculations of quantities, choice of reagent grades and required dilutions will be specified by the supervisor.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory assistants working in all industry sectors. Test solutions include those required to perform laboratory tests. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Safely use laboratory chemicals, glassware and equipment	1.1. Apply appropriate safety precautions for use of laboratory equipment and hazardous chemical materials 1.2. Use appropriate laboratory glassware and measuring equipment 1.3. Clean and store glassware and equipment in accordance with enterprise procedures
2. Make up working solutions	2.1. Identify the relevant standard methods for solution preparation 2.2. Assemble specified laboratory equipment 2.3. Select and prepare materials and solvent of specified purity 2.4. Measure appropriate quantities of reagents for solution preparation and record data 2.5. Prepare labels and log solution details in laboratory register 2.6. Transfer solutions to appropriately labelled containers
3. Check existing stock of solutions	3.1. Monitor shelf life of working solutions according to laboratory procedures

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ELEMENT	PERFORMANCE CRITERIA
	3.2. Replace out-of-date or reject solutions according to laboratory procedures 3.3. Conduct routine titrimetric analyses, if appropriate, to determine if solutions are fit for purpose

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- using appropriate materials, equipment and procedures to prepare solutions
- following appropriate occupational health and safety (OHS), and hygiene procedures, if appropriate
- using all equipment safely and efficiently
- using enterprise procedures to calculate concentrations
- identifying solutions not fit for use
- using titrations to determine the concentration of solutions
- labelling, storing and disposing of solutions appropriately
- recording and presenting data appropriately

Required knowledge

Required knowledge includes:

- relevant biological, chemical, food and laboratory terminology
- principles of metrology
- the international system of units (SI)
- concentration terms, such as % w/w, % w/v, % v/v, ppm (mg/L) and molarity
- basic theory of acids, bases, salts, buffers and neutralisation
- enterprise procedures for preparing solutions
- calculations required to prepare specified amounts of solutions of specified concentration
- appropriate OHS procedure for preparing, handling and disposal of solutions
- use of material safety data sheets (MSDS)
- relevant health, safety and environment requirements

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • prepare working solutions in compliance with relevant standards, appropriate procedures and/or enterprise requirements • follow OHS procedures to safely use laboratory chemicals glassware and equipment • make up working solutions according enterprise procedures • check existing stocks of solutions as being fit for purpose.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL922001A Record and present data* • *MSL943002A Participate in laboratory/field workplace safety*. Resources may include: • standard laboratory equipped with appropriate equipment and reagents • SOPs and testing methods • access to appropriate containers and storage facilities.
Method of assessment	The following assessment methods are suggested: • inspection of solutions prepared, labelled and stored by the candidate • review of solution records and workplace documentation completed by the candidate • feedback from peers and supervisors • observation of the candidate preparing working solutions • oral or written questioning. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess

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EVIDENCE GUIDE	
	directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Manufacturing** When starting materials used for the manufacture of common household materials are in transit from the supplier to the manufacturer, they may degrade if subjected to conditions, such as heat, moisture, light and oxygen. Even when the supplier ships quality materials to the manufacturing plant, the materials may be sub-standard when they arrive. Quality control tests are designed to test starting materials to ensure they are within specification. For example, aspirin forms salicylic acid when stored under adverse conditions. Laboratory assistants prepare and monitor the quality of solutions, such as ferric chloride solution, which gives an intense violet colour when added to salicylic acid but gives no colour with aspirin. Absence of the violet colouration indicates that breakdown of the aspirin hasn't occurred. **Biomedical** A laboratory assistant made up 1 litre of buffer solution using buffer tablets and a 1 litre volumetric flask as specified in the method. To ensure the solution was suitable for use the assistant measured the pH and found it was within acceptable range. The assistant then appropriately labelled a storage vessel and stored the buffer according to requirements. By following enterprise procedures the shelf life of the buffer was maximised.

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	Environmental An environmental laboratory is contracted to determine the acidity of water samples taken from local lakes and streams. A laboratory assistant is required to make up small batches of 0.01M sodium hydroxide and to determine its concentration by titrating it against a standard solution of potassium acid phthalate using phenolphthalein indicator. This procedure is carried out monthly to ensure that the concentration of the sodium hydroxide solution is accurately known. Alternatively, the laboratory assistant may be required to prepare and standardise a fresh batch of sodium hydroxide on a monthly basis. In this case, he/she must understand the underpinning knowledge of basic acid/base theory, potential problems of interferences (such as slow absorption of carbon dioxide by sodium hydroxide solution) so as to ensure that the concentrations of workup solutions are accurately known. He/she must also be skilled in calculating and performing dilution when required to prepare such low concentrations (0.01M) of working solutions.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • Australian and international standards, such as: • AS 2163-2000 Laboratory glassware - Measuring cylinders

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RANGE STATEMENT	
	• AS 2165-1996 Laboratory glassware - Burettes AS 2162.1-1996 Verification and use of volumetric apparatus - General - Volumetric glassware • AS ISO 1000-1998 The international system of units (SI) and its application • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories • AS/NZS 2243 Set:2006 Safety in laboratories set • Australian code of good manufacturing practice for medicinal products (GMP) • calibration and maintenance schedules • enterprise recording and reporting procedures • equipment manuals • equipment startup, operation and shutdown procedures • MSDS and safety procedures • material, production and product specifications • national measurement regulations and guidelines • principles of good laboratory practice (GLP) • production and laboratory schedules • quality manuals • standard operating procedures (SOPs)
Concepts of metrology	Concepts of metrology may include: • that all measurements are estimates • measurements belong to a population of measurements of the measured parameters • repeatability • precision • accuracy • significant figures • sources of error • uncertainty • traceability
Typical test solutions	Typical test solutions may include: • solutions required for diagnostic/analytical and limit tests in food and chemical laboratories,

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RANGE STATEMENT	
	such as sulphates, chlorides and heavy metals • solutions, such as stains for standard diagnostic/analytical procedures in biomedical/environmental laboratories, such as cell staining, fixation of cells and tissues, suspension of cells and titrimetric indicators • solutions required for laboratory maintenance and disinfection, such as 70% ethanol and hypochlorite
Laboratory equipment	Laboratory equipment may include: • pH meters • balances • magnetic stirrers, water baths and hot plates • measuring cylinders, beakers, conical flasks, volumetric flasks, pipettes and burettes • filter papers and funnels • fume cupboards
Hazards	Hazards may include: • corrosive chemicals, such as acids and alkalis • sources of heat, such as burners • sharps and broken glassware • spillages
Safety precautions	Safety precautions may include: • use of MSDS • use of personal protective equipment, such as safety glasses, gloves and coveralls • correct labelling of reagents and hazardous materials • handling and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning and/or decontamination of equipment and work areas
Monitoring quality of solutions	Monitoring quality of solutions may include: • noting turbidity to exclude absorption of moisture • noting deposits to exclude microbial contamination or chemical degradation

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RANGE STATEMENT	
	• noting crystals to exclude evaporation • conducting titrations to check concentration • noting colour changes indicating a pH shift with solutions containing indicators • checking expiry dates on solution containers
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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Co-requisite units		

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MSL973003A Prepare culture media

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to prepare culture media which is free of contamination to facilitate optimal growth of organisms and cells. It includes the ability to organise the materials, equipment and work environment and follow standard methods.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory assistants in the biomedical, biological, environmental, food processing and pharmaceutical industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare culture media	1.1. Prepare mixture of media and solvent to ensure solution and even settling of heat soluble materials 1.2. Label media to allow tracking in subsequent processes 1.3. Use a vessel large enough to endure adequate mixing and heating of the media 1.4. Dispense media into vessels for sterilisation, leaving room for expansion during heating and cooling
2. Sterilise media	2.1. Load the steriliser in keeping with maximum permitted loads and appropriate positioning of materials 2.2. Ensure a sterilisation indicator is correctly placed with the load to monitor sterilisation process 2.3. Operate sterilisation cycle in accordance with manufacturer's requirements to achieve sterilisation at the required settings 2.4. Cool media to the temperature specified in the media formulation procedures
3. Pour, label and store media	3.1. Add labile constituents where necessary, under conditions that will not lead to their denaturation or

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ELEMENT	PERFORMANCE CRITERIA
	contamination of media 3.2. Ensure even mixing of additives and media before dispensing 3.3. Aseptically dispense media to minimise occurrence of procedural contamination 3.4. Label media to allow for selection, avoiding areas of the culture vessel required for examination of colony growth 3.5. Store media to maximise shelf life and minimise contamination 3.6. Date batch media to ensure correct batch rotation 3.7. Incubate control plates as a sterility check
4. Perform quality control checks	4.1. Inspect media for any evidence of possible contamination or problems with structure or sterilisation 4.2. Check useability of selective media by growth of expected organism 4.3. Check stored stocks at regular intervals for conformance to required standards
5. Maintain work area and equipment to prevent cross-infection and contamination	5.1. Use personal protective equipment and safe work practices to ensure safety of self and others 5.2. Place disposable and reusable items into relevant receptacles 5.3. Clean and disinfect work area and equipment after use 5.4. Transport disposable and reusable contaminated materials to relevant areas for disinfection, sterilisation and cleaning or disposal

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • calculating mass and volume • measuring accurately

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REQUIRED SKILLS AND KNOWLEDGE
• making media to support growth of the relevant micro-organism or tissue • preventing cross-contamination • following enterprise procedures consistently • labelling and storing culture media according to enterprise procedures • accurately recording data • reporting non-compliance, anomalies or out of specification results • sorting, collecting, treating, recycling or disposing of waste • using appropriate personal protective equipment
Required knowledge
Required knowledge includes: • basic microbiological concepts and terminology such as growth rates in culture, production of gas and haemolysis of red cells in media • growth requirements of micro-organisms (bacteria, fungi, protozoans, viruses and multi-cellular parasites) in terms of their laboratory culture • the purpose, content and features of culture media and the relationship between the correct preparationof culture media and the optimal growth of organisms or cells • nature, properties and use of a range of biological media • the relationship between sterile practices, hygiene procedures and the ability to obtain growth free of contamination • the importance of physical requirements, such as pH and temperature on optimal growth of organisms and cells • the effect of inappropriate storage on culture media quality and performance • cleaning and sanitising requirements of equipment and work area • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure candidates can: • prepare culture media which is free of contamination to facilitate the optimal growth of organisms and

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EVIDENCE GUIDE	
	cells • use appropriate sterilisation techniques, such as maintaining adequate space between containers • perform post-sterilisation procedures, such as dispensing or adding using aseptic technique • ensure the sterilised media has cooled down sufficiently to ensure that heat labile constituents, such as blood, hormones or antibodies are not inactivated when added to the media • consistently follow enterprise procedures • report non-compliances, anomalies or out of specification results.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL943002A Participate in laboratory/field workplace safety* • *MSL973004A Perform aseptic techniques*. Resources may include: • work schedule and enterprise procedures, including advice on safe work practices • relevant equipment and personal protective equipment • MSDS.
Method of assessment	The following assessment methods are suggested: • review of quality assurance results and examination of batches of media prepared by the candidate • observation of the candidate preparing culture media • written and/or oral questioning to assess underpinning knowledge. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or

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EVIDENCE GUIDE	
	assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Food processing** A laboratory assistant's task was to prepare and pour agar plates in readiness for milk sampling. The assistant collected all the equipment and material needed to make an agar plate and ensured the working area was suitably prepared. The agar solution was carefully prepared and poured into a large conical flask prior to sterilisation in the autoclave. On completion of the sterilisation cycle, the agar was cooled to 42ºC in a water bath. It was then poured into the plates after flaming the neck of the flask. The lids were quickly replaced on the plates to minimise contamination. The plates were then stored. Any excess plates were bagged in a laminar flow unit and then placed in the fridge. The equipment was hot washed and the benches swabbed with 70% ethanol solution. **Biomedical** Media preparation is a routine task of the technical assistant. The methods and standard procedures are all documented but common working knowledge and standard 'don'ts' are not always written into the methods. Some ingredients, such as labile nutrients and antibiotics must be added under sterile conditions after the basic ingredients have been mixed and autoclaved. In one laboratory there is a list of ingredients not to be autoclaved posted on the notice board, in the media recipe book and for good measure, on the autoclave itself. One day, a technical assistant who was preparing media added all the ingredients, including the glucose, then autoclaved all 20L of it. The technical assistant learned the consequences of not paying full attention to the procedure the hard way and spent most of the day removing the 'toffee' residue from inside the autoclave!

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes procedures and/or enterprise requirements**	Standards, codes procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	  • AS/NZS 2982.1:1997 Laboratory design and construction - General requirements
	  • AS/NZS 4187:2003 Cleaning, disinfecting and sterilising reusable medical and surgical instruments and equipment and maintenance of associated environments in health care facilities
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	• Australia New Zealand Food Standards (ANZFS) Code
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• Australian Dangerous Goods Code
	• client and product specifications
	• HB 9-1994 Occupational personal protection
	• manufacturer's instructions or verbal direction from laboratory manager, supervisor or senior technician
	• material safety data sheets (MSDS)
	• National Code of Practice for the labelling of workplace substances [NOHSC:2012 (1994)]
	• occupational health and safety (OHS) national standards and codes of practice
	• operation and maintenance manuals for

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RANGE STATEMENT	
	automated media preparation equipment • principles of good laboratory practice (GLP) • production schedules and instructions • standard operating procedures (SOPs)
Equipment	Equipment may include: • balance • pH meter • hot plate stirrer and Bunsen burners • autoclave and Arnold steamer • membrane filtration equipment • measuring cylinders, flasks and glassware and Petri dishes • distilled water apparatus • automatic agar pourers • labelling equipment • refrigerators • sterilisation indicators • self-refilling syringes • Falcon dishes • media storage bottles and tissue culture bottles
Media	Media maybe prepared from: • formulated powders obtained from microbiological companies • first principles under supervision of a technical officer or scientist
Cell and tissue culture media	Cell and tissue culture media may include: • agars • broths • solutions • slopes • basic balanced salt solutions, such as Hank's or Kreb-Ringer's • deeps • enriched media, such as blood sugar, chocolate agar, tetrathionate broth and selenite broth • control media • differential media, such as eosin-methylene blue agar and MacConkey's agar • selective media, such as deoxycholate-citrate

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RANGE STATEMENT	
	agar, Lowenstein-Jensen medium • tissue culture media • labile constituents, such as blood, hormones or antibodies
Sterilisation techniques	Sterilisation techniques may include: • autoclaving • steam and membrane filtration • boiling • microwaving • radiation • high temperature • high pressure steam • gas • chemical treatments
Quality control checks	Quality control checks may include: • streaking out of cultures to a single colony • lawn cultures
Hazards	Hazards may include: • micro-organisms and agents associated with soil, air, water, blood and blood products, and human or animal tissue and fluids • sources of heat, such as ovens, burners and autoclaves • sharps and broken glassware • fluids under pressure and such as steam • radiation used for sterilisation
Safe work practices	Safe work practices may include: • use of MSDS • use of personal protective equipment, such as safety glasses, gloves and coveralls • use of biohazard containers and laminar flow cabinets • correct labelling of reagents and hazardous materials • handling and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • allowing the chamber pressure of the autoclave

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RANGE STATEMENT	
	to return to zero and temperature to cool to 80-90ÂºC before opening autoclave door to prevent boil over or plugs/caps being blown off flasks or tubes • regular cleaning and/or decontaminating equipment and work areas
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units	

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Co-requisite units		

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MSL973004A Perform aseptic techniques

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to perform aseptic techniques to maintain the integrity of both the sample source and the sample. It applies to sampling techniques in tissue culture and to generic microbiological procedures.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory assistants and technicians working in the field or laboratory in the biomedical, biological, food processing and environmental industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for aseptic sampling or transfer	1.1. Ensure that any sampling procedure conforms with the requirements of the sampling plan 1.2. Use specified personal protective clothing and equipment 1.3. Prepare the work area for safe and effective sample transfer 1.4. Select equipment and materials specified by the procedure 1.5. Organise equipment to minimise contamination during manipulations 1.6. Label containers for clear identification 1.7. Record details in relevant log or database
2. Transfer materials aseptically	2.1. Protect the integrity of the sample source by sterilising the sampling site and the mouth of transport or culture vessel 2.2. Sterilise inoculating loops and/or pipette where used

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ELEMENT	PERFORMANCE CRITERIA
	to prevent contamination 2.3. Perform transfer while minimising opportunities for contamination and cross-infection 2.4. After transfer, and before sealing the transport or culture vessel, flame the vessel mouth to maintain sterility 2.5. Re-sterilise inoculating loops, minimising the generation of aerosols 2.6. Perform quality control checks, if required 2.7. Label transport or culture vessels for clear identification
3. Maintain work area and equipment to prevent cross-infection and contamination	3.1. Place disposable and reusable items into relevant receptacles 3.2. Clean and disinfect work area and equipment after use 3.3. Transport disposable and reusable contaminated materials to relevant areas for disinfection, sterilisation and cleaning or disposal

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- sterilising equipment such as flasks, loops and pipettes
- handling of laboratory equipment and glassware to prevent contamination
- streak plating of inoculations
- sampling transfers
- labelling and storing culture media according to enterprise procedures
- recording data accurately
- reporting non-compliance, anomalies or outofspecification results
- sorting, collecting, treating, recycling or disposing of waste
- following enterprise procedures consistently
- using appropriate personal protective equipment

Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge includes: • the relationship between sterile practices, hygiene procedures and the ability to obtain growth free of contamination • cleaning and sanitising requirements of equipment and work areaand effects of physical and chemical agents on microbial growth and death • principles of infection control related to occupational health and safety (OHS), sampling and transfer of materials in microbiological investigations • disinfection and sterilisation procedures used in the collection, processing and safe disposal of samples and materials • importance of pure culture techniques and aseptic transfer to the successful microbiological investigation and correct interpretation of laboratory results • growth requirements of micro-organisms (bacteria, fungi, protozoans, viruses and multi-cellular parasites) in terms of their laboratory culture • relevant health, safety and environment requirements **Specific industry** Additional knowledge requirements may apply for different industry sectors. For example: Food processing: • food spoilage symptoms • food safety principles • beneficial/detrimental organisms relevant to specific food industry sector

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	In particular, assessors should look to see that the candidate: • follows established laboratory procedures, including recording of samples, operation of equipment and cleaning/decontamination • prevents cross-contamination of sample source and sample

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EVIDENCE GUIDE	
	• manipulates equipment to prevent contamination of culture medium during transfer • sterilises equipment as required to prevent cross-contamination of work area, personnel and environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL943002A Participate in laboratory/field workplace safety* • *MSL973003A Prepare culture media*. Resources may include: • standard laboratory with appropriate equipment and materials • enterprise procedures and standard methods • MSDS.
Method of assessment	The following assessment methods are suggested: • review of quality assurance results and examination of samples transferred by the candidate • observation of the candidate successfully transferring a range of samples • written and/or oral questioning to assess underpinning knowledge. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of

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EVIDENCE GUIDE	
	competency and show its relevance in a workplace setting. **Food processing** As part of the quality assurance program at an ice-cream manufacturer, six ice-creams were removed from the production line, placed in sterile bags and then stored in a freezer in the microbiology laboratory. Later in the morning, the laboratory assistant removed the samples from the freezer, registered the samples with the date received and test code and signed the register book. She/he then placed the samples in a water bath set at 42(C. While the samples were melting, the laboratory assistant labelled the respective agar plates with the registered codes. Using aseptic techniques she/he carefully transferred 1ml of ice-cream mix into the total plate count agar. The plates were then placed in the incubator. The final results were noted and recorded. **Biomedical** In preparation for antibiotic sensitivity testing and biochemical identification of presumed pathogenic bacteria, a technical assistant was asked to prepare a sterile peptone suspension of a lactose fermenting colony. The colony had been previously identified by the supervisor on a MacConkey's agar plate. The assistant labelled a 5mL tube of peptone broth with the sample number and a code for the identified colony and then donned a pair of disposable gloves. Bringing the labelled tube and the MacConkey's plate near to the Bunsen, she/he took an inoculating loop and sterilised it in the incandescent flame. She/he carefully cooled the loop in a sterile area of the agar and gently scraped off half the colony. With the other hand, and in the vicinity of the heated air of the Bunsen, she/he removed the cover of the peptone tube in her/his crooked finger. In a continuous and coordinated way she/he flamed the lip of the tube and emulsified the colony in the broth. She/he then flamed the lip of the tube and replaced its cover. Finally, the technical assistant re-sterilised the inoculating loop by introducing and holding it in the Bunsen flame to minimise the generation of bacterial aerosols.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	  • AS/NZS 2982.1:1997 Laboratory design and construction - General requirements
	  • AS/NZS 4187:2003 Cleaning, disinfecting and sterilising reusable medical and surgical instruments and equipment and maintenance of associated environments in health care facilities
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	• HB 9-1994 Occupational personal protection
	• Australia New Zealand Food Standards (ANZFS) Code
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• Australian Dangerous Goods Code
	• client and product specifications
	• manufacturer's instructions or verbal direction from laboratory manager, supervisor or senior technician
	• material safety data sheets (MSDS)
	• National Code of Practice for the labelling of workplace substances [NOHSC:2012 (1994)]
	• National Health and Medical Research Council (NHMRC) Guidelines
	• OHS national standards and codes of practice

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RANGE STATEMENT	
	• operation and maintenance manuals for automated media preparation equipment • principles of good laboratory practice (GLP) • production schedules and instructions • standard operating procedures (SOPs)
Personal protective equipment	Personal protective equipment may include: • gloves, safety glasses, goggles, face guards, coveralls, gowns, body suits and respirators • biohazard containers and laminar flow cabinets
Sample pot and transfer media and the subculturing and/or passaging of culture	Sample pot and transfer media and the subculturing and/or passaging of culture to: • sterile broth • media for isolation of colony • tissue culture media • media for continuous culture systems
Samples	Samples may include: • body fluids and liquids • water and soil • sterile pharmaceuticals • yeasts and moulds • milk and yoghurt • swabs and smears • propagation tissue • plant material • fermented foods and beverages
Equipment	Equipment may include: • transfer equipment, such as inoculating loops, pipettes (quantitative and qualitative), flasks, tubes and spatulas • Bunsen burners and bench incinerators • anaerobic jars • incubators, water baths, refrigerators, freezers and possibly dry ice and liquid nitrogen cylinders • laminar flow units and biohazard cabinets • autoclave or pressure cooker • swabs • continuous culture systems

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RANGE STATEMENT	
The range of material	The range of material may involve: • solid and/or liquid media • supplied media, such as media manufactured in the enterprise or raw material supplies for media • disinfecting and sterilising agents and materials, such as methylated spirits, ethanol and ether • disposable equipment and clothing • tissue culture media • growth media in broths, plates, deeps or slopes • receptacles for safe disposal of wastes and for processing of reusable materials • bar coding material and labels
Sterilisation techniques	Sterilisation techniques may include: • autoclaving • flaming • steam and membrane filtration • boiling • microwaving • radiation • high temperature • high pressure steam • gas and chemical treatments
Quality control checks	Quality control checks may include: • streaking out of cultures to a single colony • lawn cultures
Hazards	Hazards may include: • accessing the sample from difficult or dangerous areas • dry ice and liquid nitrogen vapour • ultraviolet (UV) light sources • heat from Bunsen burners • molten agar • sharps • hazardous substances and/or infectious agents
Workplace information	Workplace information may include: • SOPs

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RANGE STATEMENT	
	• specifications for safe waste disposal of bio-hazardous materials • production schedules and instructions • work notes • MSDS • manufacturer's instructions • verbal instructions from laboratory manager, supervisor or senior technician • guidelines for small scale genetic manipulation work
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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MSL973005A Assist with fieldwork

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency describes the ability to perform tasks associated with the organisation of fieldwork and field surveys. It also covers basic field survival skills and collection of samples in the field.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory and field assistants working in the environmental, mining, construction materials testing and rural industry sectors. All aspects of field and laboratory work covered by this unit of competency would be supervised by a scientific officer or technical officer. Though a supervisor may not always actually be present, the worker will follow standard operating procedures that clearly describe the permitted scope of practice. This unit of competency does not include gaining clearance for animal trapping, tagging, keeping or experimentation. It does not cover animal handling techniques. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Assist with organisation of fieldwork	1.1. Purchase supplies and equipment as specified by senior staff 1.2. Assemble supplies and equipment and check against inventory 1.3. Pack supplies and equipment appropriately for safe transport
2. Support field operations	2.1. Check unpacked items against inventory 2.2. Store supplies and equipment as specified 2.3. Restock supplies as necessary 2.4. Collect and/or dispose of waste in accordance with enterprise and environmental requirements
3. Assist with field activities	3.1. Assemble equipment and materials for fieldwork as directed

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ELEMENT	PERFORMANCE CRITERIA
	3.2. Collect samples, if required, in accordance with enterprise procedures, animal care and ethics and other legislative requirements 3.3. Store samples in accordance with special requirements for continued wellbeing, viability or integrity of sample 3.4. Perform simple field measurements as directed 3.5. Collect and maintain records of site data as directed
4. Demonstrate basic field survival skills	4.1. Follow specified safety procedures 4.2. Follow specified survival procedures in the event of emergencies and accidents 4.3. Wear suitable clothing as protection against solar radiation, extreme temperatures and impact injury
5. Assist with the completion of fieldwork	5.1. Pack supplies, equipment and samples appropriately for safe return transport 5.2. Check and clean used equipment to prevent deterioration and contamination 5.3. Check that the condition of vehicles, equipment and materials comply with environmental/quarantine requirements for preventing transfer of pests 5.4. Return supplies and equipment to storage at enterprise location 5.5. Conduct a stocktake of equipment and supplies for replenishment where required 5.6. Assist with the dispatch of collected samples for laboratory analysis, as necessary

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • using two-way radio and satellite phone in accordance with enterprise procedures • using basic field survival strategies, such as map reading, use of compass and global positioning system (GPS) and 'stay with vehicle' in the event of accident or emergency

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REQUIRED SKILLS AND KNOWLEDGE
• organising, packing/unpacking and stowing materials and equipment with close attention to detail • collecting samples in accordance with enterprise procedures and legislative requirements • storing andmaintaining samples in accordance with special requirements for continued wellbeing, viability and integrity of sample • maintaining accurate and complete data records and checklists • working safely and in accordance with environmental requirements • cleaning equipment and collecting and disposing of wastes in accordance with safety and environmental requirements
Required knowledge
Required knowledge includes: • terms used to describe the relevant industry sector's field equipment, materials, samples and specimens • enterprise procedures relating to sample collection, maintenance and storage • enterprise procedures relating to field testing • specific legislation and codes of practice related to sample and animal collection (if relevant in the industry sector) • principles of safety relating to fieldwork, such as use of LPG, operation of generators and use of protective clothing • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • perform all field activities according to enterprise procedures, legislative and environmental requirements, industry guidelines and codes of practice • complete all tasks efficiently and safely.
Context of and specific resources for	This unit of competency is to be assessed in the

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EVIDENCE GUIDE	
assessment	workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL913001A Communicate with other people* • *MSL913002A Plan and conduct laboratory/field work.* Resources may include: • enterprise procedures, regulations and codes of practice • relevant field equipment, samples, test kits and reagents.
Method of assessment	The following assessment methods are suggested: • review of performance with a focus on completing field activitiessafely and efficiently, collection of field samples and data, basic field survival skills, teamwork and accurate record keeping • paper exercises associated with organisation of fieldwork, fieldwork operations and basic field survival strategies • role plays based on possible accident and emergency situations requiring use of communication procedures and basic field survival strategies • oral or written questions. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace

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EVIDENCE GUIDE	
	setting. **Environmental (1)** On a field trip to determine the biodiversity of an island fringing reef, a technical assistant assists with constructing a grid map of the study area. The assistant counts the number of six different species of plant in part of the grid, taking care to minimise the impact on the environment. He/she also accurately records the data on a map to show the location of each plant using a predetermined key. **Environmental (2)** A technical assistant is asked to pack and safely transport water sampling and monitoring equipment to a distant field site. Firstly, the assistant checks that all the equipment is in working order and that he/she is able to use and maintain it. Given that the technical assistant is licenced to operate a small boat and is a competent underwater diver, he/she also performs a simple underwater survey of macrophytes in a lake in the study area. The assistant follows standard safety and operating procedures and records the results on a grid map and in the daily log book. **Construction materials testing** A contract laboratory has assigned a team of three to conduct pavement investigations in a rural/remote region. The field assistant uses a checklist to assemble all the required equipment and supplies for a three day trip. The assistant checks the vehicle, toolkit and spares, communication equipment, GPS, water, first aid kit and personal protective equipment. He/she also checks that the generator, fuel, jackhammer,dynamic cone penetrometer (DCP), sample bags, measuring devices and camera are all present and in good working order. Because the team will be working away from base for three days, the assistant knows that it is vital that all items are present and stowed safely before he/she tells the team leader that the vehicle is ready for departure.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards such as:
	  • AS 1678 Emergency procedure guide -Transport
	  • AS 1940-2004 Storage and handling of flammable and combustible liquids
	  • AS 4332-2004 The storage and handling of gases in cylinders
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	  • AS/NZS 4452:1997 The storage and handling of toxic substances
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	• animal welfare legislation and codes of practice
	• Australian Dangerous Goods Code
	• Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Codes of Practice
	• basic sampling procedures (labelling, preparation, storage, transport and disposal)
	• basic test procedures (validated and authorised)
	• cleaning, hygiene and personal hygiene requirements
	• environmental requirements related to disposal

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RANGE STATEMENT	
	of waste • first aid kit and survival manual • incident and accident/injury reports • instructions to comply with new legislation, standards, guidelines and codes • material safety data sheets (MSDS) • occupational health and safety (OHS) national standards and codes of practice • safety requirements for equipment, materials or products • written fieldwork procedures, standard operating procedures (SOPs) and operating manuals
Items of equipment	Items of equipment may include: • pH meters, dissolved oxygen probes, portable colourimeters, field microscopes, hand centrifuges, sieves and filters • chemical field test kits • environmental monitoring systems • equipment required for the collection of samples and animals • equipment required for ensuring the wellbeing of animals • equipment suitable for the safe collection and disposal of biological and non-biological wastes • basic first aid equipment • data loggers • communication systems, such as two-way radio and conventional codes and symbols for signalling • tools, vehicle recovery equipment and spare parts • navigation and communication equipment, including GPS
Hazards	Hazards may include: • solar radiation, dust and noise • personnel getting lost • incidents or emergencies, such as snake or animal bites • severe weather conditions

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RANGE STATEMENT	
	• manual handling of heavy objects • vehicle and boat handling in rough/remote conditions • moving machinery and hand tools • driving vehicles in rough terrain and over long distances during day or night
Safety procedures	Safety procedures may include: • use of personal protective equipment, such as sunscreen, hats, safety glasses, gloves and safety boots • 'stay with vehicle' and other basic survival techniques • use of a regular communication schedule • handling, storage and disposal of all hazardous materials/waste in accordance with MSDS, labels, and enterprise procedures and regulations
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL973006A Prepare trial batches for evaluation

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to prepare trial batches of materials for evaluation. Materials can include soil, minerals and manufactured products, such as concrete, asphalt, food, plastics, paint and other industrial chemicals.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory assistants working in all industry sectors. It describes work conducted by laboratory assistants, generally working under the guidance of a senior technician or laboratory supervisor/manager. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for trial batch mixing	1.1. Identify the job, materials, appropriate procedures and safety requirements 1.2. Record description of the job to be undertaken, compare with specification and report any variations 1.3. Select and prepare tools, equipment and materials in accordance with job requirements 1.4. Confirm the properties and quantities of materials to be used 1.5. Confirm that the required materials are available and ready for use
2. Mix trial batch for evaluation	2.1. Measure out quantities of materials ready for mixing 2.2. Mix the materials according to established procedures 2.3. Discharge the mixture ready for inspection and testing according to established procedures 2.4. Record details of the mix and any observations

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ELEMENT	PERFORMANCE CRITERIA
	according to established procedures
3. Evaluate properties of the mixture by inspection and standard test methods	3.1. Obtain representative samples of the mix for testing 3.2. Perform specified tests according to established procedures 3.3. Handle and transport samples in accordance with established procedures 3.4. Label samples and record details in accordance with established procedures
4. Clean equipment and dispose of materials	4.1. Clean mixing, measuring, sampling and testing equipment after use 4.2. Return unused materials to storage 4.3. Dispose of excess materials safely and ethically
5. Maintain records	5.1. Record data in accordance with established procedures 5.2. Maintain equipment records in accordance with established procedures 5.3. Maintain confidentiality of enterprise information
6. Maintain a safe work environment	6.1. Use established safe work practices and personal protective equipment to ensure personal safety and that of other laboratory personnel 6.2. Minimise the generation of wastes and environmental impacts 6.3. Ensure safe disposal of laboratory and hazardous wastes 6.4. Clean, care for and store equipment and reagents as required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- performing simple calculations
- making accuratemeasurements of volume and mass
- representative sampling

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REQUIRED SKILLS AND KNOWLEDGE
• working safely with equipment and hazardous materials • working safely in laboratory and field conditions • setting up and maintaining tools and equipment • using tools and equipment to perform basic sampling and testing techniques • observing and recording information on testing and sampling • handling, transporting and storing materials • observing interpreting and reporting atypical situations
Required knowledge
Required knowledge includes: • the international system of units (SI) • concepts of metrology • the properties of mixing materials and how they affect the properties of the final product • hazards involved with materials and equipment involved • representative sampling • uses of various materials/enterprise products • basic testing methods for relevant materials • enterprise traceability requirements • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • perform operations in accordance with laboratory and/or enterprise procedures, and appropriate legislative requirements • accurately measure, calculate and record batch quantities, concentrations and other relevant parameters • evaluate properties of the mixture by inspection and standard test methods

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EVIDENCE GUIDE	
	• recognise and report problems and atypical situations to relevant personnel.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL952002A Handle and transport samples or equipment* • *MSL954001A Obtain representative samples in accordance with sampling plan* • *MSL973001A Perform basic tests*. Resources may include: • standard facility with appropriate tools, equipment and materials • enterprise procedures, MSDS and product formulation/specifications.
Method of assessment	The following assessment methods are suggested: • analysis of trial batches prepared by the candidate over a period of time to ensure accurate and consistent work is obtained within required timelines • inspection of workplace documentation completed by the candidate • feedback from peers and supervisors • use of suitable simulation and/or a range of case studies/scenarios. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study

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EVIDENCE GUIDE	
	below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Construction materials** A laboratory assistant works for a concrete manufacturer. A client requires concrete for a specific project that cannot be supplied using existing standard mixes. The manufacturer must use special aggregates and cement to meet the durability and strength specifications for the project. The laboratory manager obtains quantities of the materials for evaluation purposes. The assistant tests the aggregates to determine their grading properties. From these results, he/she designs a mix to satisfy the project specifications using a standard design method. The mix requires the use of pozzolanic materials and admixtures that were obtained from the suppliers. The manager provides the assistant with the batch quantities required to produce one cubic metre of concrete. To test the mix design, the assistant will produce a 20litre batch in the laboratory. He/she calculates that this quantity will provide sufficient material for the required tests, without undue waste. He/she calculates the quantity of each material required for the trial batch. The assistant selects and prepares the tools and equipment she needs to mix, sample and test the concrete. He/she wears overalls, safety boots and glasses, and uses a barrier cream. He/she measures out the quantities required for the trial batch, charges the mixer and allows it to mix for the specified time. He/she then discharges the concrete onto a suitable surface. He/she checks its slump, cohesiveness and air content, recording the data on standard enterprise forms. The manager inspects the concrete, and decides that it is over-sanded and has excessive slump. He/she adjusts the batch quantities and draws up amended values. He/she disposes of the excess concrete and cleans the equipment and tools. He/she then mixes a new batch using the amended figures. This process continues until the manager is satisfied with the concrete quality. He/she then mixes a larger batch so that he/she can prepare specimens for testing its hardened-state properties.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • Australian and international standards such as: • AS ISO 1000-1998 The international system of units (SI) and its application • enterprise recording and reporting procedures • enterprise sampling procedures for specific samples, sites and clients • equipment manuals • equipment startup, operation and shutdown procedures • maps and site plans • material safety data sheets (MSDS) • material, production and product/formulation specifications • national measurement regulations and guidelines • production and laboratory schedules • safety procedures • standard operating procedures (SOPs)
Materials, **tools and equipment**	Materials, tools and equipment may include: • soils, concrete, asphalt, aggregates, polymers, ceramics, metals, foodstuffs and solvents • ovens, sieves, balances, volumetric measures and mixers • hand tools, including shovels, scoops and spatulas • consumables, including sample bags and labels • documentation, including specifications,

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RANGE STATEMENT	
	manufacturers' handbooks and worksheets • test equipment appropriate to the various materials
Simple calculations	Simple calculations may include: • proportion, ratio and percentage for batch quantities • concentrations • other relevant parameters
Concepts of metrology	Concepts of metrology may include: • that all measurements are estimates • measurements belong to a population of measurements of the measured parameters • repeatability • precision • accuracy • significant figures • sources of error • uncertainty • traceability
Typical problems	Typical problems may include: • not following SOPs • measurement errors • calculation errors • materials of unreliable quality • insufficient mixing • poor sampling procedures • equipment breakdown and breakage
Hazards	Hazards may include: • electric shock • biohazards, such as microbiological organisms and agents associated with soil, air and water • solar radiation, dust and noise • chemicals • sharps, broken glassware and hand tools • flammable liquids and gases • fluids under pressure • manual handling heavy objects • crushing, entanglement and cuts associated

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RANGE STATEMENT	
	with moving machinery or falling objects
Safety procedures	Safety procedures may include: • recognising hazard warnings and safety signs • use of personal protective equipment, such as hard hats, hearing protection, sunscreen lotion, gloves, safety glasses, goggles, face guards, coveralls and safety boots • use of MSDS • following established manual handling procedures • regular cleaning and/or decontaminating of equipment and work areas • ensuring access to service shut-off points • identifying and reporting operating problems or equipment malfunctions
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL973007A Perform microscopic examination

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to set up a light microscope for optimum resolution, to prepare routine samples and to observe, identify and report sample characteristics.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory or technical assistants in all industry sectors. The unit of competency covers limited interpretation and analysis of results. Troubleshooting of equipment and procedures is not required. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Interpret test requirements	1.1. Review test request to identify samples to be tested, test method and equipment involved 1.2. Identify hazards associated with the sample, preparation methods and equipment and implement enterprise control measures
2. Set up work area for preparation and examination of samples	2.1. Collect equipment and arrange the workspace so that equipment can be used safely and efficiently 2.2. Perform pre-use and safety checks to ensure equipment is fit for purpose and report faulty or unsafe equipment to appropriate personnel
3. Prepare samples for examination	3.1. Log and label samples according to enterprise procedures to ensure traceability 3.2. Check suitability of the original and prepared sample for the examination and report unsuitable samples to appropriate personnel 3.3. Prepare and store the sample for examination following enterprise methods

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ELEMENT	PERFORMANCE CRITERIA
4. Set up and use a light microscope	4.1. Set up the light path to optimise resolution 4.2. Select the appropriate objectives and filter for the sample being examined 4.3. Ensure that the lenses are clean 4.4. Adjust settings and alignment of the light path to optimise performance 4.5. Place sample correctly on the stage
5. Observe, identify and report sample characteristics	5.1. Recognise and identify significant sample characteristics 5.2. Perform required calculations accurately 5.3. Prepare and view control samples and check that results are consistent with expected values 5.4. Identify and report out of specification or atypical results promptly to appropriate personnel 5.5. Record and report data in accordance with enterprise procedures
6. Maintain a safe work environment	6.1. Ensure safety and minimise cross-contamination through the use of personal protective clothing and safety equipment 6.2. Handle all samples and equipment in accordance with enterprise safety protocols 6.3. Clean up spills using appropriate techniques to protect personnel, work area and environment 6.4. Minimise generation of waste and environmental impacts 6.5. Collect and dispose of all wastes safely 6.6. Report hazards and incidents to designated personnel using enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • setting up the workbench and microscope ergonomically

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REQUIRED SKILLS AND KNOWLEDGE
• setting up, cleaning and using a light microscope to achieve optimum resolution of the specimen • using personal protective clothing and other safety equipment correctly • performing counts on samples • performing basic measurements using grids • logging and tracking samples through all steps from receiving a sample through to completion of a procedure and reporting • interpreting and recording test results, including simple calculations • correctly handling and storing samples and equipment
Required knowledge
Required knowledge includes: • parts and functions of a light microscope • importance and appropriate use of controls and certified reference materials • hazards and risks in laboratories associated with performing microscopic examination • enterprise and/or legal traceability requirements • relevant health, safety and environment requirements **Specific industry** Additional knowledge requirements may apply for different industry sectors. For example: Biological industry: • basic structure and function of cells and organelles • basic classes and classification of organisms of organisms, such as prokaryotes, eukaryotes, plants, animals, bacteria, viruses and prions • cell physiology and processes, such as simple and facilitated diffusion, plasmolysis, osmosis, tonicity, active transport, energy production, mitosis, motility, phagocytosis and pinocystosis • purposes and mechanisms of staining (e.g. Gram +ve and -ve)

Evidence Guide

EVIDENCE GUIDE	
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Overview of assessment	

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • follow enterprise standards, procedures and practices • prepare suitable samples • recognise, identify and document significant sample characteristics • set up a light microscope for optimal resolution • maintain personal safety and that of others • minimise cross-contamination and contamination of the laboratory and environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL922001A Record and present data* • *MSL933002A Contribute to the achievement of quality objectives* • *MSL943002A Participate in laboratory/field workplace safety* • *MSL953001A Receive and prepare samples for testing*. Resources may include: • standard laboratory equipped with appropriate equipment, such as light microscopes and samples • enterprise procedures, standard methods and materials.
Method of assessment	The following assessment methods are suggested: • observation of the candidate performing microscopic examinations • review of data records prepared by the candidate, such as counts, observations and results • feedback from supervisors and peers about adherence to enterprise/technical procedures • questioning to assess underpinning knowledge. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and

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EVIDENCE GUIDE	
	disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Construction materials testing** The supply of river sand is running out and quarries are accessing alternative sources of sand for use in concrete mixes in construction. The sand should not be an aggregate that is likely to break down into smaller particles. A technician in a quarry company is required to analyse samples of crushed rock using a light microscope. The technician looks for characteristics of the sample, such as angularities, roundness, sharpness, cracks, presence of organic matter, mineral structure and whether the particles are a conglomerate. If the sample does not meet the characteristics, the company will need to treat it to make it suitable for use in concrete mixes (for example by washing, crushing and sieving). **Food processing** A customer complaint is received about the baking properties of a flour delivery. The laboratory assistant at the flour mill is given the task of testing the starch content of the suspect flour. He/she prepares iodine stained samples of the returned flour and a range of baked and partially baked products prepared from it. First, the assistant makes up fresh iodine staining solution and then prepares slides of each sample for microscopic examination. He/she identifies the characteristic starch granules of the flour sample and records the degree of gelatinisation in the starch granules in the baked samples. He/she discusses the results with the supervisor and prepares a report for the customer. **Biomedical** A laboratory assistant works in the microbiology laboratory of a public hospital and is responsible for

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EVIDENCE GUIDE	
	preparing and staining sputum smears from patients for micro and culture. The assistant puts on a clean gown and gloves before collecting the specimens from the reception area of the laboratory. The assistant prepares cultures of the sputum specimens on simple and selective media before preparing, fixing and staining smears for microscopic examination. The results are checked by the supervisor, entered into the laboratory information management system (LIMS) and sent to the appropriate section of the hospital. **Environmental** A laboratory assistant prepares media for plant tissue culture. There has been some contamination of Gram-positive bacteria in the last two batches and the supervisor has initiated an overhaul of the preparation and aliquotting procedure. The laboratory assistant has been asked to follow the new procedure exactly and to remove samples at each stage of ingredient addition for microscopic examination. The laboratory assistant records the exact addition amounts, batch numbers and brands of the reagents, the location of the addition (which biohazard cabinet), the equipment used and the pre-sterilisation records of all equipment. The laboratory assistant then prepares slides, fixes them and performs a Gram stain on each of the aliquots removed from the new preparation run. Microscopic analysis of each aliquot reveals nil contamination. The supervisor decides that there has been a breach in the old procedure and the laboratory assistant is asked to follow the new procedure and to perform a routine microscopic check on all batches for the next month.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS ISO 9000 Set:2008 Quality management systems set
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	• principles of good laboratory practice (GLP)
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• safety manuals
	• quality manuals and equipment and procedure manuals
	• standard operating procedures (SOPs)
	• material safety data sheets (MSDS)
	• enterprise recording and reporting procedures
	• production and laboratory schedules
	• material, production and product specifications

Preparation of samples	Preparation of samples may include: • aseptic transfer of specimen • centrifugation • cooling • drying • filling a counting chamber in one continuous flow without bubbles or overflow • filtration • fixing of films to minimise cell damage and the production of artefacts • labelling • mounting of stained films, sections and whole mounts to ensure long term preservation • permanent labels for smears, films and sections for presentation, storage and retrieval • physical or chemical separation

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RANGE STATEMENT	
	• selection of diluent to preserve or enhance visibility of the cells to be counted • selection, filling and cover slipping of a clean, dry counting chamber to ensure even distribution of cells during filling • serial dilution to enable individual cells to be reliably counted • staining of fixed material to illustrate required characteristics • sub-sampling • thin film or smear on a slide
Checking sample condition	Checking sample condition may include: • labelling • spillage • spoilage due to incorrect storage and transport conditions • temperature control • suitability for the examination
Pre-use checks	Pre-use checks may include: • calibration • cleaning/checking use by dates of reagents • routine maintenance
Equipment	Equipment may include: • glass slides • counting chambers (e.g. haemocytometer) • optical graticules and stage micrometers • tissue culture flasks
Light microscopes	Light microscopes may include: • bright field illumination microscopic examination up to 1000x magnification • stereomicroscopes and dissection microscopes • compound microscopes • phase contrast microscopes • inverted microscopes
Biological samples	Biological samples may include: • smears, impression smears, sections, squashes, films and whole mounts • a monolayer of cells in smears and films

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RANGE STATEMENT	
	• fixed smears for demonstration of bacteria by the methylene blue and Gram staining techniques • blood films stained by a Romanowsky technique to clearly show differentiation of granulocytes • stained sections of animal tissues using regressive haematoxylin and eosin to differentiate cytoplasmic and nuclear detail • differentially stained monocotyledon and dicotyledon stem sections to demonstrate the structure of vascular bundles (xylem, phloem and cambium) • stained whole mounts of helminths • whole mounts, such as liver flukes, planaria and samples of animal faeces to demonstrate ova, cysts and larvae • pond water organisms • onion root tip squash • midstream sample of urine
Physical samples	Physical samples may include: • sand • asbestos fibres • coal samples • construction testing materials • geological specimens
Checking prepared samples	Checking prepared samples may include looking for: • clean and scratch-free microscope slides to reduce artefacts • preparation according to SOPs • a homogeneous suspension of sample • films and smears that have been fixed rapidly • thin films with a monolayer of cells • appropriate whole mounts for intact organisms • correct sample identification during and after processing
Sample characteristics	Sample characteristics are restricted to what can be viewed by bright light microscopy and may include:

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RANGE STATEMENT	
	• shape and size of particles • presence of contamination • colour • consistency and variability • number of cells (e.g. cells in blood or other particulate samples, such as a yeast suspension or pollen grains) • type of cells, percentage of atypical cells, presence/absence of cells, size of cells, viable and non-viable cells and trajectory • presence of stained material, such as starch • colour/staining and morphology • motility
Calculations	Calculations may include: • dilutions • percentage viability • number of cells in original sample after dilution • calculation of cells/ml in a number of squares of a counting chamber
Hazards	Hazards may include: • micro-organisms and agents associated with soil, air, water, blood and blood products and human or animal tissue and fluids • chemicals and stains • sharps and broken glassware • aerosols
Safety practices and personal protective equipment	Safety practices and personal protective equipment may include: • use of MSDS • use of personal protective equipment, such as safety glasses, gloves and coveralls • use of biohazard containers and laminar flow cabinet • correct labelling of reagents and hazardous materials • handling and storing hazardous materials and equipment in accordance with labels, MSDS and manufacturer's instructions • ergonomic layout, correct illumination and

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RANGE STATEMENT	
	organisation of workbench • regular cleaning and/or decontamination of equipment and work areas
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL973012A Assist with geotechnical site investigations

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to prepare for and assist with site activities such as excavations, sampling and testing as part of a geotechnical investigation team. Personnel are expected to identify common site problems and seek advice to deal with situations beyond their own technical competence.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory assistants working under the close supervision of a senior technician in the construction, mining and drilling industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for on-site operations	1.1. Confirm details of the job, location, work instructions, appropriate sampling/test procedures and safety requirements with supervisor 1.2. Identify likely site hazards, personal protective equipment and safety procedures that are specified for the job and materials used 1.3. Collect, check, and stow all tools, equipment and materials required at the site 1.4. Confirm site access requirements such as entry permits and participate in safety induction as required
2. Assist with excavation of boreholes, test pits and/or trenches	2.1. Confirm specified sampling/testing locations with supervisor 2.2. Excavate to the specified sampling/testing depth, minimising disturbance and potential contamination of the site 2.3. Ensure materials from different strata are kept separate

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ELEMENT	PERFORMANCE CRITERIA
	2.4. Recognise materials and record changes of strata, test results
3. Assist with site sampling	3.1. Prepare and check sampling equipment and materials 3.2. Take disturbed and undisturbed samples as directed and in accordance with enterprise methods/procedures 3.3. Label samples and record samples/site conditions in accordance with enterprise methods/procedures
4. Assist with site testing	4.1. Conduct pre-use checks of test equipment 4.2. Perform basic tests as directed and in accordance with test methods or enterprise procedures 4.3. Record data in accordance with test methods or enterprise procedures 4.4. Recognise obvious errors or atypical data and seek advice
5. Assist with finalising site operations	5.1. Reinstate the site in accordance with instructions 5.2. Clean all equipment (and vehicle as necessary) avoiding environmental damage, stormwater contamination or spread of pests 5.3. Check all equipment/materials prior to re-stowing them for safe transport 5.4. Handle and transport samples in accordance with enterprise procedures 5.5. Notify appropriate site personnel on completion of tasks and prior to leaving site (if unsupervised) 5.6. On return to base, check serviceability of test equipment before storage
6. Assist with maintaining records	6.1. Complete relevant parts of site safety plans, equipment logs and test reports in accordance with enterprise procedures 6.2. Maintain confidentiality of enterprise information
7. Maintain a safe work environment	7.1. Use safe work procedures and protective equipment to ensure personal safety and that of others 7.2. Minimise environmental impacts of testing/sampling and generation of waste 7.3. Collect and/or dispose of all waste in accordance with enterprise procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- interpreting maps, site plans and drawings
- recognising site services, sampling and testing sites
- setting up, checking, using and cleaning/maintaining tools and equipment
- taking representative samples, handling and transporting samples
- recognising soil, rock and fill materials
- recognising site features and geotechnical conditions
- performing basic insitu tests and site measurements (e.g. location and depth)
- maintaining accurate and compete records
- communicating problems to appropriate personnel
- driving safely on and off-road
- working safely on construction sites around heavy equipment and earthmoving plant

Required knowledge

Required knowledge includes:

- the basic concepts, purposes and principles of geotechnical site investigation
- site safety and management rules (safety induction, risk assessments, controlledentry/exit to site and required protective equipment and clothing)
- simple methods for identifying and classifying materials
- basic engineering properties of soil and rock materials and their use in engineering and construction
- basic principles of representative sampling and testing
- basic insitu testing methods
- relevant occupational health, safety (OHS) and environment requirements

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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EVIDENCE GUIDE	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • prepare for site operations and perform geotechnical sampling, testing and site reinstatement under direction • work safely at geotechnical investigation sites • follow instructions and work as part of a small team.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment through observation over time. The timeframe must allow for adequate assessment of operation under all normal and a range of abnormal conditions. Where this is not practical, additional assessment techniques must be used. This unit of competency may be assessed with: • *MSL952002A Handle and transport samples or equipment* • *MSL952001A Collectroutine site samples* • *MSL973001A Perform basic tests*. Resources may include: • access to geotechnical sites, tools, equipment • enterprise procedures, sampling plans, test methods and equipment manuals.
Method of assessment	The following assessment methods are suggested: • review of work outputs over a period of time to ensure accurate and consistent work is obtained within required timelines • examples of completed workplace documentation • feedback from peers and supervisors • oral or written questioning. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or

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EVIDENCE GUIDE	
	assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Construction materials** A geotechnical consultancy company is carrying out the investigation for the construction of an industrial complex involving building pads and roadways. A contract drilling company has been hired to carry out auger drilling for the building pad foundations. The drill rig will be used to perform standard penetration tests in some boreholes to determine bearing capacities. Undisturbed sample tubes will be pushed to obtain samples for consolidation testing in the laboratory. A senior technician is in charge of site activities and arranges for the drill rig to be on-site. She/he plans a program of drilling, sampling and testing and a laboratory assistant is assigned to assist with drilling, testing and sampling operations at the site. The senior technician has a marked-up plan of the site showing borehole locations to help him/her direct where to drill. The drilling contractor operates the drill rig, takes tube samples, performs the standard penetration tests and cases the hole if required, as directed by the senior technician. The assistant assists with recording and sampling the soil profile, sealing the sample tubes with wax and labeling them. He/she also records the SPT readings and bags and labels the material from the split-spoon sampler. Each borehole is capped to prevent access by unauthorised persons so that the assistant can record the standing water level 24 hours after the hole has been drilled. The assistant wears a helmet, work boots and earmuffs while working near the rig. He/she covers up and wears sunscreen while working in the sun and drinks large quantities of water. The assistant also excavates hand auger holes to a depth of 1 m at regular intervals in the proposed roadways to obtain samples for California Bearing Ratio (CBR) tests.

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EVIDENCE GUIDE	
	Adjacent to each, he/she performs a dynamic cone penetrometer test to 2 m to assess the insitu material. He/she records the logs of the auger holes and the test results on the company's standard data sheets and backfills each auger hole immediately after sampling.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS ISO 1000-1998 The international system of units (SI) and its application
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	  • AS/NZS ISO 9000 Set:2008 Quality management systems set
	• calibration and maintenance schedules
	• enterprise recording and reporting procedures
	• environmental legislation and regulations
	• equipment manuals
	• equipment startup, operation and shutdown procedures
	• industry codes of practice
	• material, production and product specifications

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RANGE STATEMENT	
	• National Association of Testing Authorities (NATA) documents regarding construction materials testing • OHS national standards and codes of practice • production and laboratory schedules • quality manuals • standard operating procedures (SOPs)
Site hazards	Site hazards may include: • solar radiation, dust and noise • manual handling of heavy materials and equipment • working in/on trenches, confined spaces, wet and uneven surfaces, heights and slopes • vehicular and pedestrian traffic • underground services such as gas and electricity
Safety procedures	Safety procedures may include: • location of site services before investigations commence • use of material safety data sheets (MSDS) • use of personal protective equipment, such as hard hats, hearing protection, sunscreen, gloves, masks, goggles, coveralls and safety boots • handling and storage of (hazardous) materials and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning of equipment and vehicles • machinery guards • signage, barriers, flashing lights and traffic control
Tools and equipment	Tools and equipment may include: • hand tools, including shovels, crowbars, scoops, spanners, wrenches and tape measure • consumables, including sample bags, labels, sample tubes and wax • documentation, including maps, plans and worksheets • field test equipment, including dynamic cone

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RANGE STATEMENT	
	penetration (DCP) testing, standard penetration testing (SPT), shear vane, pocket penetrometers and water level indicator • safety clothing and equipment, including helmets, boots, gloves, earmuffs and glasses • excavation equipment, including hand and power augers, powered excavators, generators and jack hammers
Common site problems	Common site problems may include: • caving in of excavation walls • drilling difficulties • sample loss during retrieval • knowing when to stop a hole, or what and when to test and sample • misidentification of samples and sampling locations • equipment breakdown and breakage • environmental impacts of construction activities on wildlife, vegetation, waterways and inclement weather • working close to earth moving equipment, trucks and overhead loads
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL974001A Prepare, standardise and use solutions

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to prepare, standardise and monitor the quality of solutions.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory technicians working in all industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare solutions	1.1. Select appropriate procedure for solution preparation 1.2. Select equipment, materials and solvent of specified purity 1.3. Measure appropriate quantities of reagents for solution preparation and record data. 1.4. Select and assemble specified laboratory equipment and appropriate grade of glassware 1.5. Perform specified dilutions 1.6. Prepare solutions to achieve homogeneous mix of the specified concentration 1.7. Label and store solutions to maintain identity and stability
2. Standardise and use volumetric solutions	2.1. Assemble appropriate laboratory equipment 2.2. Perform serial dilutions as required 2.3. Standardise the solution to the required specified range and precision 2.4. Label and store solutions to maintain identity and stability 2.5. Use standard volumetric solutions to determine concentration of unknown solutions
3. Calculate and record data	3.1. Calculate specified concentrations 3.2. Use authorised procedure if data is to be modified

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ELEMENT	PERFORMANCE CRITERIA
	3.3. Estimate and document uncertainty of measurement in accordance with enterprise procedures, if required 3.4. Record all relevant details according to laboratory procedures and report results 3.5. Report concentration with appropriate units
4. Monitor the quality of laboratory solutions	4.1. Check solutions for visual deterioration and expiry date 4.2. Restandardise or dispose of dated or deteriorated solutions 4.3. Record details and label solutions according to laboratory procedures
5. Maintain a safe work environment	5.1. Use established safe work practices and personal protective equipment to ensure personal safety and that of other laboratory personnel 5.2. Clean up spills using appropriate techniques to protect personnel, work area and environment 5.3. Minimise generation of waste and environmental impacts 5.4. Ensure the safe collection of laboratory and hazardous waste for subsequent disposal 5.5. Store equipment and reagents as required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- interpreting and following enterprise standard operating procedures (SOPs)
- determining equivalence points using indicators and graphical methods
- using calculation methods, including appropriate units, uncertainties, balancing equations, the concentration of the solution given the chemical reaction for the titration
- using apparatus and reagents to prepare standard solutions such as balances and volumetric glassware
- selecting and using primary and secondary standards and indicators
- performingquality assurance checks for solution performance

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REQUIRED SKILLS AND KNOWLEDGE
• performing titrations • recognising control results that are not within acceptable range • interpreting and using safety information, such as that provided by material safety data sheets (MSDS) and follow relevant safety procedures
Required knowledge
Required knowledge includes: • solution terminology, chemistry of acids, bases, buffers, redox reactions and complexiometric reactions • concepts of metrology • grades of glassware, reagents and their use • reactions used for standardisation and desirable characteristics • enterprise communication and reporting procedures • occupational health and safety (OHS) procedures, including those for using corrosive materials • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • use balances and volumetric glassware • select and use primary and secondary standards • select and use indicators • perform quality assurance checks for solution performance • perform titrations using laboratory procedures with required accuracy and precision and within required timelines • calculate the concentration of the solution given the chemical reaction for the titration • recognise control results that are not within acceptable range

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EVIDENCE GUIDE	
	• record results to enterprise standards • label and store solutions in accordance with enterprise procedures • interpret and follow enterprise SOPs • interpret and use safety information, such as that provided by MSDS and follow relevant safety procedures.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *relevant MSAL974000 series units of competency, and* • *relevant MSAL975000 series units of competency dealing with sampling, tests and measurements*. Resources may include: • standard laboratory equipped with appropriate volumetric equipment • laboratory reagents and equipment • SOPs and testing methods.
Method of assessment	The following assessment methods are suggested: • inspection and/or testing of solutions prepared by the candidate • review of records and workplace documentation completed by candidate • review of work outputs by the candidate over time to ensure accuracy, consistency and timeliness • feedback from peers and supervisors • observation of the candidate preparing, standardising and using a range of solutions • oral or written questioning. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or

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EVIDENCE GUIDE	
	assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Manufacturing** A standard solution is used to determine the concentration of unknown solutions. The quality of these analyses is critically related to the accuracy with which the concentration of the standard solution is known. Therefore, laboratory technicians spend considerable effort to ensure that the materials and methods used for the preparation and standardisation will lead to a solution of accurately known concentration. For example, anhydrous sodium carbonate is often used to prepare solutions to determine the concentrations of acids. The sodium carbonate is heated at a suitable temperature to remove any trace of moisture and cooled in a dessicator. An appropriate quantity is dissolved in distilled water and made up to volume in a volumetric flask. This solution of known concentration is then titrated with acids of unknown concentration and the concentration of the acids determined. **Environmental** A laboratory technician was required to determine the total acidity of a water sample as part of a quality control program. The total acidity was measured by titrating the water sample with sodium hydroxide of known concentration using an appropriate indicator. The concentration of the sodium hydroxide was determined via a volumetric titration against a primary standard of potassium hydrogen phthalate. The value of the total acidity was determined by multiplying the volume of sodium hydroxide used with a numerical 'factor' which had been determined by the laboratory supervisor in order to save time. The value of the 'factor' was displayed on the titration equipment. However, a new technical assistant did the full calculation and found that his/her result differed slightly

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EVIDENCE GUIDE	
	from that obtained using the 'factor'. After discussion with the laboratory supervisor it was agreed that the error was in the 'factor' and the assumption that each new batch of sodium hydroxide prepared was exactly the same concentration as all previous batches. This was incorrect as the concentration of each batch differed slightly and its actual concentration was determined accurate, using the primary standard. The procedure was changed so that the full calculation was required for all tests.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS 2163-2000 Laboratory glassware - Measuring cylinders
	  • AS 2165-1996 Laboratory glassware - Burettes AS 2162.1-1996 Verification and use of volumetric apparatus - General - Volumetric glassware
	  • AS ISO 1000-1998 The international system of units (SI) and its application
	  • AS/NZS ISO 9000 Set:2008 Quality management systems set
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories

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RANGE STATEMENT	
	• AS/NZS 2243 Set:2006 Safety in laboratories set • Australian code of good manufacturing practice for medicinal products (GMP) • calibration and maintenance schedules • enterprise recording and reporting procedures • equipment manuals • equipment startup, operation and shutdown procedures • MSDS and safety procedures • material, production and product specifications • national measurement regulations and guidelines • principles of good laboratory practice (GLP) • production and laboratory schedules • quality manuals • SOPs • waste minimisation and safe disposal procedures
Solutions	Solutions may include but are not limited to: • solutions of strong/weak acids and bases • oxidising/reducing agents • solutions used for complexometric or precipitation titrations • stains for cells and tissues, enzymes, buffers and antibodies • diluents for maintaining isotonicity • organic solutions and histological fixatives
Apparatus and reagents to prepare standard solutions	Apparatus and reagents to prepare standard solutions may include: • balances • pipettes, burettes, volumetric glassware and weighing bottles • dessicators and filtering media • ovens and muffle furnaces • solutions, indicators and primary and secondary standards • auto titrators, pH meters and other related meters and electrodes for determining equivalence points, top pan and analytical

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RANGE STATEMENT	
	balances • magnetic stirrers and heaters, and water baths
Checking useability of solutions	Checking useability of solutions may include: • examining stained samples for correct staining reactions • performing pH checks • confirming enzyme activity • checking red cell suspensions for haemolysis • ferric chloride for phenolic solutions • isotonicity for saline
Hazards	Hazards may include: • chemicals, such as strong acids and bases, and stains • sharps and broken glassware • burners, hot plates, ovens and furnaces
Safe work practices	Safe work practices may include: • use of MSDS • use of personal protective equipment, such as gloves, safety glasses, goggles, faceguards, coveralls and gowns • use of biohazard containers, laminar flow cabinets and fume hoods • correct labelling of reagents and hazardous materials • handling and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning and/or decontaminating of equipment and work areas
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard

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RANGE STATEMENT	
	precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL974002A Conduct geotechnical site investigations

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to prepare for and conduct and conclude site activities such as excavations, sampling and testing as part of a geotechnical investigation team. Personnel are expected to solve common site problems and seek advice to deal with situations beyond their own technical competence. This competency is typically performed by laboratory technicians working under the guidance of a geotechnical paraprofessional or engineer.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory technicians working in the construction, mining and drilling industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		
	MSL973012A	*Assist with geotechnical site investigations*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for on-site operations	1.1. Identify the job, location, work instructions, appropriate sampling/test procedures and safety requirements 1.2. Identify site hazards and identify appropriate personal protective equipment and safety procedures that are specified for the job and materials used 1.3. Record description of the job to be undertaken, compare with specification and report any variations 1.4. Arrange for the collection, checking, stowing and transport of all tools, equipment and materials required at the site 1.5. Ensure site access requirements, such as entry permits and safety inductions have been organised

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ELEMENT	PERFORMANCE CRITERIA
2. Arrange excavation of boreholes, test pits and/or trenches	2.1. Identify the sampling/testing location 2.2. Excavate or oversee excavation to the sampling/testing depth, minimising disturbance and potential contamination of the site 2.3. Identify materials and record changes of strata, test results and other relevant information 2.4. Ensure materials from different strata are kept separate 2.5. Terminate the excavation at the appropriate depth and record the reason for termination
3. Conduct site sampling	3.1. Prepare and check sampling equipment and materials 3.2. Take disturbed and undisturbed samples in accordance with enterprise methods/procedures 3.3. Label and record samples in accordance with enterprise methods/procedures 3.4. Recognise and record details of site conditions that may impact on sample integrity or site interpretation
4. Conduct testing	4.1. Prepare and conduct pre-use checks of test equipment 4.2. Perform, or assist with performing, tests in accordance with test methods or enterprise procedures 4.3. Record test data in accordance with test methods or enterprise procedures 4.4. Recognise obvious errors or atypical data and take appropriate corrective actins
5. Finalise site operations	5.1. Backfill or seal any excavation and ensure that it is left in a safe and uncontaminated condition 5.2. Reinstate surfaces disturbed by sampling or testing 5.3. Clean all equipment (and vehicle, as necessary) avoiding environmental damage, stormwater contamination or spread of pests 5.4. Check all equipment/materials prior to re-stowing them for safe transport 5.5. Handle and transport samples in accordance with established practices 5.6. Notify appropriate site personnel on completion of investigations and prior to leaving site 5.7. On return to base, check serviceability of test equipment before storage

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ELEMENT	PERFORMANCE CRITERIA
6. Maintain records	6.1. Maintain equipment records in accordance with established practices 6.2. Complete site safety plans, equipment logs and test reports in accordance with enterprise procedures 6.3. Maintain confidentiality of enterprise information
7. Maintain a safe work environment	7.1. Use safe work procedures and protective equipment to ensure personal safety and that of others 7.2. Minimise environmental impacts of testing/sampling and generation of waste 7.3. Collect and/or dispose of all waste in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- interpreting maps, site plans and drawings
- identifying and locating site services, sampling and testing sites (e.g. global positioning system (GPS))
- setting up, checking, using and cleaning/maintaining tools and equipment
- taking representative samples, handling and transporting samples
- identifying soil, rock and fill materials
- observing, interpreting and reportingsite features and geotechnical conditions
- performing basic in situ tests and site measurements (e.g. location and depth)
- maintaining accurate and complete records
- communicating problems to appropriate personnel
- driving safely on and off-road
- working safely on construction sites aroundheavy equipment and earthmoving plant

Required knowledge

Required knowledge includes:

- the basic concepts, purposes and principles of geotechnical site investigation
- identification and classification of materials

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REQUIRED SKILLS AND KNOWLEDGE
• engineering properties of soil and rock materials • representative sampling and testing • uses of soil and rock materials in engineering and construction • insitu testing methods • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify and locate site services, sampling and testing sites and recognise site problems • use tools and equipment effectively and efficiently • collect representative samples and handle and transportthem correctly • record sampling and testing information • identify and describe materials accurately • observe, interpret and report geotechnical conditions • communicate problems to appropriate personnel and seek advice • record and communicate work results • work safely.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment through observation over time. The timeframe must allow for adequate assessment of operation under all normal and a range of abnormal conditions. Where this is not practical, additional assessment techniques must be used. This unit of competency may be assessed with: • *MSL952002A Handle and transport samples or equipment* • *MSL954001A Obtain representative samples in accordance with sampling plan*

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EVIDENCE GUIDE	
	• *MSL973001A Perform basic tests*. Resources may include: • access to sites, tools and equipment • enterprise procedures, sampling plans, test methods and equipment manuals.
Method of assessment	The following assessment methods are suggested: • review of work outputs over a period of time to ensure accurate and consistent work is obtained within required timelines • examples of completed workplace documentation • feedback from peers and supervisors • oral or written questioning. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Construction materials** A geotechnical consultancy company is carrying out the investigation for the construction of an industrial complex involving building pads and roadways. A contract drilling company has been hired to carry out auger drilling for the building pad foundations. The drill rig will be used to perform standard penetration tests in some boreholes to determine bearing capacities. Undisturbed sample tubes will be pushed to obtain samples for consolidation testing in the laboratory.

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EVIDENCE GUIDE	
	A senior technician is in charge of site activities, and arranges for a drill rig. She/he plans a program of drilling, sampling and testing. A laboratory assistant is allocated to carry out the majority of site activities. These include overseeing drilling, testing and sampling operations. He/she is provided with a marked-up plan of the site showing borehole locations so that he/she can direct where to drill. The senior technician makes site visits every second day to oversee the work. The drilling contractor operates the drill rig, takes tube samples, performs the standard penetration tests and cases the hole if required, as directed by the senior technician. The assistant records and samples the soil profile, seals the sample tubes with wax and labels them. He/she also records the SPT readings and bags and labels the material from the split-spoon sampler. Each borehole is capped to prevent access by unauthorised persons so that the assistant can record standing water level 24 hours after the hole has been drilled. He/she wears a helmet, safety boots and earmuffs while working near the rig. He/she covers up and wears sunscreen while working in the sun and drinks large quantities of water. The assistant also excavates hand auger holes to a depth of one metre at regular intervals in the proposed roadways to obtain samples for California Bearing Ratio (CBR) tests. Adjacent to each, he/she performs a dynamic cone penetrometer test to two metres to assess the insitu material. He/she records the logs of the auger holes and the test results on the company's standard data sheets and backfills each auger hole immediately after sampling. He/she reports each day's activities to the senior technician using the company's standard summary form. He/she is confident to identify soil types thus minimising the need for laboratory testing of the samples taken. Based on the field logs, cross-sections of the site can be drawn so that the designer can assess its geotechnical characteristics and determine the extent of any further investigations.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • industry codes of practice • environmental legislation and regulations • standard operating procedures (SOPs) • equipment manuals • equipment startup, operation and shutdown procedures • calibration and maintenance schedules • quality manuals • enterprise recording and reporting procedures • production and laboratory schedules • material, production and product specifications
Site hazards	Site hazards may include: • solar radiation, dust and noise • manual handling of heavy materials and equipment • working in/on trenches, confined spaces, wet and uneven surfaces, heights and slopes • vehicular and pedestrian traffic
Safety procedures	Safety procedures may include: • location of site services before investigations commence • use of material safety data sheets (MSDS) • use of personal protective equipment, such as hard hats, hearing protection, sunscreen, gloves, masks, goggles, coveralls and safety boots • handling and storage of (hazardous) materials

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RANGE STATEMENT	
	and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning of equipment and vehicles • machinery guards • signage, barriers, flashing lights, traffic control
Tools and equipment	Tools and equipment may include: • hand tools, including shovels, crowbars, scoops, spanners, wrenches and tape measures • consumables, including sample bags, labels, sample tubes and wax • documentation, including maps, plans and worksheets • field test equipment, including dynamic cone penetration (DCP) testing, standard penetration testing (SPT), shear vane, pocket penetrometers and water level indicator • safety clothing and equipment, including helmet, boots, gloves, earmuffs and glasses • excavation equipment, including hand and power augers
Common site problems	Common site problems may include: • caving of the excavation • drilling difficulties • not knowing the requirements of the design engineer • not understanding the nature of the item being designed (e.g. retaining wall, piled structure and earthworks) • sample loss during retrieval • knowing when to stop a hole, or what and when to test and sample • misidentification of samples and sampling locations • equipment breakdown and breakage • environmental problems and issues, including site access, inclement weather, traffic, wildlife, vegetation and construction activities
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements • all operations must comply with enterprise

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RANGE STATEMENT	
	OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL974003A Perform chemical tests and procedures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to interpret chemical test requirements, prepare samples, conduct pre-use and calibration checks on equipment and perform routine chemical tests/procedures. These tests will involve several measurement steps. The unit includes data processing and interpretation of results and tracking of obvious test malfunctions where the procedure is standardised. However, personnel are not required to analyse data, optimise tests/procedures for specific samples or troubleshoot equipment problems where the solution is not apparent.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory or technical assistants and instrument operators in all industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Interpret and schedule test requirements	1.1. Review test request to identify samples to be tested, test method and equipment/instruments involved 1.2. Identify hazards and enterprise control measures associated with the sample, preparation/test methods, reagents and/or equipment 1.3. Plan work sequences to optimise throughput of multiple samples, if appropriate
2. Receive and prepare samples	2.1. Log samples using standard operating procedures (SOPs) 2.2. Record sample description, compare with specification and note and report discrepancies 2.3. Prepare samples and standards in accordance with chemical testing requirements 2.4. Ensure traceability of samples from receipt to

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ELEMENT	PERFORMANCE CRITERIA
	reporting of results
3. Check equipment before use	3.1. Set up equipment/instruments in accordance with test method requirements 3.2. Perform pre-use and safety checks in accordance with relevant enterprise and operating procedures 3.3. Identify faulty or unsafe components and equipment and report to appropriate personnel 3.4. Check equipment calibration using specified standards and procedures, if applicable 3.5. Quarantine out of calibration equipment/instruments 3.6. Ensure reagents required for the test are available and meet quality requirements
4. Test samples to determine chemical species or properties	4.1. Operate equipment/instruments in accordance with test method requirements 4.2. Perform tests/procedures on all samples and standards, if appropriate, in accordance with specified methods 4.3. Shut down equipment/instruments in accordance with operating procedures
5. Process and interpret data	5.1. Record test data noting atypical observations 5.2. Construct calibration graphs, if appropriate, and compute results for all samples from these graphs 5.3. Ensure calculated values are consistent with expectations 5.4. Record and report results in accordance with enterprise procedures 5.5. Estimate and document uncertainty of measurement in accordance with enterprise procedures, if required 5.6. Interpret trends in data and/or results and report out of specification or atypical results promptly to appropriate personnel 5.7. Determine if obvious procedure or equipment problems have led to atypical data or results
6. Maintain a safe work environment	6.1. Use established safe work practices and personal protective equipment to ensure personal safety and that of other laboratory personnel 6.2. Minimise the generation of wastes and environmental impacts 6.3. Ensure the safe collection of laboratory and hazardous waste for subsequent disposal 6.4. Care for and store equipment and reagents as

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ELEMENT	PERFORMANCE CRITERIA
	required
7. Maintain laboratory records	7.1. Enter approved data into laboratory information management system 7.2. Maintain confidentiality and security of enterprise information and laboratory data 7.3. Maintain equipment and calibration logs in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- interpreting test methods and procedures
- sample preparation procedures
- performing calibration checks
- using instruments for qualitative and/or quantitative analysis
- maintaining and evaluating reagents
- troubleshooting basic equipment/method
- using calculation methods, including appropriate units, uncertainties, balancing equations, and the concentration of the solution given the chemical reaction for the titration
- preparing calibration graphs and calculating results using appropriate units and precision
- applying theoretical knowledge to interpret gross features of data and make relevant conclusions such as identifying atypical results as out of normal range or an artefact
- tracing and sourcing obvious causes of an artefact
- recording and communicating results in accordance with enterprise procedures
- maintaining security, integrity, traceability of samples, sub-samples, test data, results and documentation

Required knowledge

Required knowledge includes:

- chemical principles and concepts underpinning test/procedure
- purpose of the tests

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REQUIRED SKILLS AND KNOWLEDGE
• concepts of metrology • principles and concepts related to equipment/instrument operation and testing • function of key components of the equipment/instrument and/or reagents • effects of modifying equipment/instrument variables • use of calibration procedures • enterprise and/or legal traceability requirements • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • interpret test methods/procedures accurately • prepare and test samples using procedures appropriate to the nature of sample • perform calibration checks (if required) • safely operate test equipment/instruments to enterprise standards and/or manufacturer's specification • prepare calibration graphs and calculate results using appropriate units and precision • apply basic theoretical knowledge to interpret gross features of data and make relevant conclusions • identify atypical results as out of normal range or an artefact • traces and source obvious causes of an artefact • communicate problems to a supervisor or outside service technician • record and communicate results in accordance with enterprise procedures • maintain security, integrity, traceability of samples, sub-samples, test data and results and documentation.
Context of and specific resources for	This unit of competency is to be assessed in the

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EVIDENCE GUIDE	
assessment	workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL924001A Process and interpret data* • *MSL974001A Prepare, standardise and use solutions*. Resources may include: • standard laboratory equipped with appropriate test equipment/instruments, standards and reagents • enterprise procedures and standard methods.
Method of assessment	The following assessment methods are suggested: • review of test data/results obtained by the candidate over a period of time to check accuracy, consistency and timeliness of results • review of test records and workplace documentation completed by the candidate • observation of candidate conducting a range of chemical tests and procedures and sample preparation • feedback from peers and supervisors • oral or written questioning of chemical principles and concepts, test methods and enterprise procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Manufacturing**

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	Ultraviolet spectroscopy is a suitable method for determining the concentration of sulphanilamide in pharmaceutical preparations. The ultraviolet absorption spectrum is pH dependent, with the wavelength maximum different in acid and alkaline solutions. Example: a technician was conducting an analysis and noted that the wavelength maxima had moved from approximately 250nm to below 230nm. After reviewing the procedure being used and checking for possible errors, the technician found that an incorrect solvent had been used for the analysis. The hydrochloric acid solvent was replaced with sodium hydroxide, as per the standard method, and the correct absorption spectrum was obtained. **Environmental** A technician was asked to test water samples from a local lake over several days to determine the lake's nutrient levels following reports of algal blooms in the lake over the preceding weeks. He/she used a field colorimeter kit to determine both nitrates and orthophosphates using SOPs. Because the same colorimetric cells were used for the nitrate and orthophosphate tests, they were carefully washed and rinsed with distilled water between all tests (as specified in the SOP). After reviewing the results from the first three days, the technician noted that the first orthophosphate result, which was done immediately after all the nitrate tests, was much higher than subsequent orthophosphate tests which were all consistently low. The technician argued that the 'high' results for the first orthophosphate test may be due to cross-contamination from trace amounts of reagents used in previous nitrate tests despite having closely followed the cleaning/rinsing SOPs. After discussion with his/her supervisor, the technician modified the field procedures by using totally different colorimetric cells for the nitrate and orthophosphate tests. For all subsequent tests no 'high' orthophosphate results were obtained for the first sample. As a result, the laboratory supervisor amended the SOPs to incorporate this new requirement. **Food processing** Regular checks are conducted on the percentage of salt in cheese at a dairy company's laboratory. A technician checks the results from the airomatic salt-titration

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EVIDENCE GUIDE	
	equipment and, if the results are abnormal, notifies the supervisor before taking appropriate action. After obtaining a high result, for example, the assistant notified the supervisor and then began checking the machine to identify a possible reason for the high reading. He/she found that the supply bottle of silver nitrate used in the test was almost empty. This had resulted in less solution being pumped through the equipment than required, leading to graph readings that indicated a high percentage of salt. After replacing the silver nitrate bottle and recalibrating the equipment, the assistant retested the cheese samples and found that they contained the expected 1-2% salt.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS 2134.1-1999 Recommended practice for chemical analysis by atomic absorption spectrometry - Flame atomic absorption spectrometry
	  • AS 2162.1-1996 Verification and use of volumetric apparatus - General - Volumetric glassware
	  • AS 3753-2001 Recommended practice for chemical analysis by ultraviolet/visible spectrophotometry

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RANGE STATEMENT	
	• AS ISO 1000-1998 The international system of units (SI) and its application • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories • AS/NZS 2243 Set:2006 Safety in laboratories set • AS/NZS ISO 9000 Set:2008 Quality management systems set • Australian code of good manufacturing practice for medicinal products (GMP) • calibration and maintenance schedules • enterprise recording and reporting procedures • equipment manuals • equipment startup, operation and shutdown procedures • industry methods, such as Royal Australian Chemical Institute (RACI) and/or American Association of Cereal Chemists (AACC) methods for inorganic constituents • material safety data sheets (MSDS) and safety procedures • material, production and product specifications • national measurement regulations and guidelines • principles of good laboratory practice (GLP) • production and laboratory schedules • quality manuals and equipment and procedure manuals • SOPs • waste minimisation and safe disposal procedures
Sample preparation processes	Sample preparation processes may include: • grinding • mulling • preparation of discs • digestion • dissolving • ashing • refluxing • tracting

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RANGE STATEMENT	
	• filtration • evaporation • flocculation • precipitation • washing • drying • centrifugation

Non-instrumental test/procedures	Non-instrumental test/procedures may include:
	• gravimetric analysis:
	  • loss on drying
	  • suspended solids
	  • ashes, such as sulphated and gravimetric assays (e.g. sulphates and nitrogen in fertilisers)
	  • Ni by dimethylglyoxime
	  • bitumen content of asphaltic concrete
	• titrimetric analysis:
	  • acid/base determinations
	  • complexiometric, such as water hardness, Fe by dichromate and binder content analysis
	  • redox, such as precipitation of chlorides in water
	  • dissolved oxygen (DO), chemical oxygen demand (COD) and biochemical oxygen demand (BOD)
	• filtration, separation and solvent extraction techniques
	• corrosion testing, cement content and accelerated weathering

Instrumental tests	Instrumental tests may include: • spectrometry • chromatography • electrochemistry
Types of instrumentation and instrumental techniques	Types of instrumentation and instrumental techniques may include: • colorimetric techniques, such as enzyme activity, chlorine in water, specific cations and anions

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RANGE STATEMENT	

	• infrared, ultraviolet-visible (UV-VIS) spectrophotometry
	• other spectrometric techniques:
	  • fluorimetric analysis, flame atomic emission and flame atomic absorption spectrometry
	  • fourier transform infrared
	• chromatographic techniques:
	  • column and thin layer analytical and preparative chromatography
	  • gas or liquid chromatography for purity, raw material and formulation checks
	  • ion chromatography for detection of nitrates, phosphates, sulphates, chlorides and bromides
	  • gel filtration chromatography for purification of proteins
	• electrochemical techniques, such as pH, eH, conductivity and ion-selective electrodes
	• electrophoretic techniques for DNA patterns and determination of protein purity
	• soil testing:
	  • moisture content
	  • organic matter content
	  • specific anions and cations
	• auto-analysers for determination of total P, total Kjeldahl N, orthophosphate, nitrite/nitrate and ammonia

Chemical principles and concepts	Chemical principles and concepts may include: • ions, atoms, molecules, bonding and links to chemical properties • chemical reactions involving acid/base, redox, complex ion formation, solubility and equilibrium • energy levels and absorption/emission spectra
Chemical tests methods	Chemical tests methods may include: • control of starting materials, in-process materials and finished products • environmental monitoring • basic troubleshooting and/or problem solving

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RANGE STATEMENT	
	within the scope of SOPs and enterprise processes

Hazards	Hazards may include:
	• chemicals:
	  • acids (e.g. sulphuric, perchloric and hydrofluoric)
	  • heavy metals and pesticides
	  • anions (e.g. fluoride)
	  • hydrocarbons (e.g. mono-aromatics)
	• aerosols from broken centrifuge tubes, pipetting
	• sharps and broken glassware
	• flammable liquids and gases
	• cryogenics, such as dry ice and liquid nitrogen
	• fluids under pressure, such as hydrogen in gas liquid chromatography, acetylene in atomic absorption spectrometry
	• sources of ignition
	• high-temperature ashing processes
	• disturbance or interruption of services

Hazard control measures:	Hazard control measures may include: • ensuring access to service shut-off points • recognising and observing hazard warnings and safety signs • labelling of samples, reagents, aliquoted samples and hazardous materials • handling and storage of hazardous materials and equipment in accordance with labelling, MSDS and manufacturer's instructions • identifying and reporting operating problems or equipment malfunctions • cleaning and decontaminating equipment and work areas regularly using enterprise procedures • using personal protective clothing and equipment, such as gloves, safety glasses and coveralls • using containment facilities (PCII, PCIII and PCIV physical containment laboratories), containment equipment (biohazard containers, laminar flow cabinets, Class I, II and III

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RANGE STATEMENT	
	biohazard cabinets) and containment procedures • reporting abnormal emissions, discharges and airborne contaminants, such as noise, light, solids, liquids, water/waste water, gases, smoke, vapour, fumes, odour and particulates to appropriate personnel
Records	Records may include: • test and calibration results • equipment use, maintenance and servicing history • faulty or unsafe equipment
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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MSL974005A Perform physical tests

Modification History

Release 2 - wording clarified in Required Skills and Evidence Guide. Equivalent outcomes.

Unit Descriptor

This unit of competency covers the ability to interpret physical test requirements, prepare samples, conduct pre-use and calibration checks on equipment and perform routine physical tests. These tests will involve several measurement steps. The unit includes data processing and interpretation of results and tracking of obvious test malfunctions where the procedure is standardised. However, personnel are not required to analyse data, optimise tests/procedures for specific samples or troubleshoot equipment problems where the solution is not apparent.

Application of the Unit

This unit of competency is applicable to laboratory or technical assistants and instrument operators working in the manufacturing, environment, food and construction materials testing industry sectors.

Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section ‘This competency in practice’.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the	Performance criteria describe the performance needed to

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essential outcomes of a unit of competency.	demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Interpret and schedule test requirements	1.1. Review test request to identify samples to be tested, test method and equipment/instruments involved 1.2. Identify hazards and enterprise control measures associated with the sample, preparation/test methods and/or equipment 1.3. Plan work sequences to optimise throughput of multiple samples, if appropriate
2. Receive and prepare samples	2.1. Log samples using standard operating procedures (SOPs) 2.2. Record sample description, compare with specification and note and report discrepancies 2.3. Prepare samples and standards in accordance with physical testing requirements 2.4. Ensure traceability of samples from receipt to reporting of results
3. Check equipment before use	3.1. Set up equipment/instruments in accordance with test method requirements 3.2. Perform pre-use and safety checks in accordance with relevant enterprise and operating procedures 3.3. Identify faulty or unsafe components and equipment and report to appropriate personnel 3.4. Check equipment calibration using specified procedures, if applicable 3.5. Quarantine out of calibration equipment/instruments
4. Test samples to determine physical properties	4.1. Operate equipment/instruments in accordance with test method requirements 4.2. Perform tests/procedures on all samples and standards, if appropriate, in accordance with specified methods 4.3. Shut down equipment/instruments in accordance with operating procedures

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ELEMENT	PERFORMANCE CRITERIA
5. Process and interpret data	5.1. Record test data noting atypical observations 5.2. Ensure calculated values are consistent with expectations 5.3. Estimate and document uncertainty of measurement in accordance with enterprise procedures, if required 5.4. Record and report results in accordance with enterprise procedures 5.5. Interpret trends in data and/or results and report out of specification or atypical results promptly to appropriate personnel 5.6. Determine if obvious procedure or equipment problems have led to atypical data or results
6. Maintain a safe work environment	6.1. Use established safe work practices and personal protective equipment to ensure personal safety and that of other laboratory personnel 6.2. Minimise the generation of wastes and environmental impacts 6.3. Ensure the safe collection of laboratory and hazardous waste for subsequent disposal 6.4. Care for and store equipment and materials as required
7. Maintain laboratory records	7.1. Enter approved data into laboratory information management system 7.2. Maintain confidentiality and security of enterprise information and laboratory data 7.3. Maintain equipment and calibration logs in accordance with enterprise procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- using equipment/instruments for qualitative and/or quantitative analysis
- interpreting test methods and procedures
- sample preparation procedures
- performing calibration checks

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- metrology techniques underpinning test/procedure including estimating uncertainty
- troubleshooting basic equipment/method
- preparing calibration graphs, if required, and calculating results using appropriate units and precision
- applying theoretical knowledge to interpret gross features of data and make relevant conclusions such as identifying atypical results as out of normal range or an artefact
- tracing and sourcing obvious causes of an artefact
- recording and communicating results in accordance with enterprise procedures
- maintaining security, integrity, traceability of samples, sub-samples, test data, results and documentation

Required knowledge

Required knowledge includes:

- physical principles and concepts underpinning the test/procedure
- purpose of tests
- function of key components of the equipment/instrument
- effects on test of modifying equipment/instrument variables
- sample preparation procedures
- concepts of metrology
- basic equipment/method troubleshooting procedures
- enterprise and/or legal traceability requirements
- relevant health, safety and environment requirements

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • interpret test methods/procedures accurately • prepare and test samples in accordance with specified methods • ensure equipment/instrumentation is within calibration before use • safely operate test equipment/instruments to enterprise standards and/or manufacturer's specifications • apply basic knowledge of physical properties of materials to interpret gross features of data and make

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	relevant conclusions • identify atypical results, such as out of normal range or an artefact • trace and source obvious causes of an artefact • communicate problems to a supervisor or outside service technician • calculate, record and communicate results in accordance with enterprise procedures • maintain security, integrity and traceability of samples, sub-samples, test data/results and documentation.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL924001A Process and interpret data.* Resources may include: • standard laboratory equipped with appropriate test equipment/instruments, standards and materials • enterprise procedures and standard methods.
Method of assessment	The following assessment methods are suggested: • review of test data/results obtained by the candidate over a period of time to check accuracy, consistency and timeliness of results • review of test records and workplace documentation completed by the candidate • observation of candidate conducting a range of physical tests and procedures and sample preparation • feedback from peers and supervisors • oral or written questioning of physical principles and concepts, test methods and enterprise procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.

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	Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Manufacturing** A technical assistant was measuring the specific density of a shipment of glycerol using a standard laboratory procedure. The result did not agree with the manufacturer's certificate of analysis. The assistant notified the manufacturer who came to the plant and checked the delivered material. It had been raining while the glycerol was in transit and rain water had entered the drum, diluting the glycerol. The drum was returned to the manufacturer and a new drum was supplied to the manufacturing plant. The manufacturer investigated the seals on the glycerol drums and took action to ensure that new seals would protect the product in transit. **Food processing** A technician was testing the melt flow index of a new type of polymer that was to be used as a sealant for packages of freeze dried coffee. The technician measured the melt flow rate and found it was much too high. The technician then checked the melt flow equipment as per the manufacturer's directions and found the machine was out of calibration. After recalibration using recommended standards, another sample was obtained and retested. This time, the polymer was within specification and was released for use in production.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work

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environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, codes, procedures and/or enterprise requirements	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS ISO 1000-1998 The international system of units (SI) and its application
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	  • AS/NZS ISO 9000 Set:2008 Quality management systems set
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• calibration and maintenance schedules
	• data quality procedures
	• enterprise recording and reporting procedures
	• equipment startup, operation and shutdown procedures
	• material safety data sheets (MSDS)
	• material, production and product specifications
	• national measurement regulations and guidelines
	• principles of good laboratory practice (GLP)
	• production and laboratory schedules
	• quality manuals, equipment and procedures manuals
	• SOPs

Physical principles and concepts underpinning the test/procedure	Physical principles and concepts underpinning the test/procedure may include: • matter, interatomic and intermolecular forces and states of matter • mass, weight, forces, pressure, energy, friction and slip resistance • properties of gases, pressure/volume/temperature, density, diffusion and compressibility • cohesive/adhesive forces, hydrostatic pressure, fluid flow, viscosity and friction • thermal expansion, thermal conductivity and

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	coefficients of expansion • changes of state, energy content, enthalpy change and endothermic and exothermic processes • electromagnetic spectrum, primary/secondary colours, reflection, refraction diffraction and interference of light • electrical concepts, including electric field, voltage, current, resistance and AC/DC • electromagnetic concepts, including magnetic field and flux, and electromagnetic induction • sound concepts, including wave properties, amplitude, frequency and loudness (dB) • elasticity, hardness, strength of materials, plasticity, permeability and dispersion • electrical safety concepts including voltage, current, resistance, conductors/insulators and AC/DC
Preparation of samples	Preparation of samples may include processes, such as: • drying, washing, grinding, sieving, melting and moisture conditioning • cutting, trimming or machining of test specimens, etching

Physical tests and procedures	Physical tests and procedures may include:
	• precise measurement of position, orientation and dimensions:
	  • three-dimensional setup of manufacturing tools using inclinometers, verniers and laser
	  • thickness using vernier, X-ray and gamma ray
	  • particle size using sieving and laser
	  • dimensional stability involving expansion, contraction and weathering
	  • movement using strain gauge and accelerometer
	• mass, density and specific gravity:
	  • moisture/density relationship
	  • compaction
	  • loose and compacted density
	• thermal tests:
	  • thermal conductivity
	  • coefficients of expansion (e.g. linear and volume)
	  • melt flow index
	  • calorimetry, (e.g. specific heat and latent heat)
	  • combustion properties (e.g. enthalpy and energy

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	content) • drying times • thermal stability of products • optical tests: • flatness and surface finish • refractive index • optical rotation • transmission/absorption of filters • colour matching of products • acoustic tests: • absorption, reflection and transmission • intensity, attenuation and loudness (dB) • amplitude and frequency • electrical tests: • conductance, resistance and insulation • temperature dependence of dielectrics • magnetic tests: • permeability • retentivity, hysteresis loss and coercivity • intrinsic induction
Test and sample preparation equipment/materials	Test and sample preparation equipment/materials may include: • crushers, mulchers, grinders, mills, riffles and sieves • moulds, bags and containers • ovens, microwaves and water baths • mass balances • microscopes • dimension apparatus (e.g. calipers and micrometer) • rammers, compression rigs and load cells • chemical reagents and volumetric glassware • temperature measuring devices, such as thermometers and thermocouples • pH and conductivity meters • analogue and digital meters, charts/recorders, data loggers and computers
Tests	Tests may include methods for: • control of starting materials, in-process materials and finished products • investigation of sources of construction materials • basic troubleshooting of enterprise processes

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Hazards	Hazards may include: • microbiological organisms and agents, associated with soil, air and water • chemicals, such as acids and solvents • radiation, such as alpha, beta, gamma, X-ray and neutron • sharps, broken glassware and hand tools • flammable liquids and gases • cryogenics, such as dry ice and liquid nitrogen • fluids under pressure, such as steam and industrial gases • sources of ignition • burners and ovens • disturbance or interruption of services • crushing, entanglement and cuts associated with moving machinery (grinders)
Hazard control measures	Hazard control measures may include: • ensuring access to service shut-off points • recognising and observing hazard warnings and safety signs • labelling of samples and hazardous materials • handling and storage of hazardous materials and equipment in accordance with labelling, MSDS and manufacturer's instructions • identifying and reporting operating problems or equipment malfunctions • cleaning equipment and work areas regularly using enterprise procedures • using personal protective clothing and equipment, such as gloves, safety glasses, coveralls and safety boots • following established manual handling procedures • reporting abnormal emissions, discharges and airborne contaminants, such as noise, light, solids, liquids, water/waste water, gases, smoke, vapour, fumes, odour and particulates to appropriate personnel
Records	Records may include: • test and calibration results • equipment use, maintenance and servicing history • faulty or unsafe equipment

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Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation – these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Competency field	
Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL974010A Perform mechanical tests

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to interpret mechanical test requirements, prepare samples, conduct pre-use and calibration checks on equipment and perform routine mechanical tests. These tests will involve several measurement steps. The unit includes data processing and interpretation of results and tracking of obvious test malfunctions where the procedure is standardised. However, personnel are not required to analyse data, optimise tests/procedures for specific samples or troubleshoot equipment problems where the solution is not apparent.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory or technical assistants and instrument operators working in the manufacturing, food and construction materials testing industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Interpret and schedule test requirements	1.1. Review test request to identify samples to be tested, test method and equipment/instruments involved 1.2. Identify hazards and enterprise control measures associated with the sample, preparation/test methods and/or equipment 1.3. Plan work sequences to optimise throughput of multiple samples, if appropriate
2. Receive samples and prepare test pieces	2.1. Log samples using standard operating procedures (SOPs) 2.2. Record sample description, compare with specification and note and report discrepancies 2.3. Prepare test pieces, and standards if appropriate, in accordance with mechanical testing requirements 2.4. Ensure traceability of samples from receipt to

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ELEMENT	PERFORMANCE CRITERIA
	reporting of results
3. Check equipment before use	3.1. Set up equipment/instruments in accordance with test method requirements 3.2. Perform pre-use and safety checks in accordance with relevant enterprise and operating procedures 3.3. Identify faulty or unsafe components and equipment and report to appropriate personnel 3.4. Check equipment calibration using specified procedures, if applicable 3.5. Quarantine out-of-calibration equipment/instruments
4. Test samples to determine mechanical properties	4.1. Operate equipment/instruments in accordance with test method requirements 4.2. Perform tests/procedures on all test pieces and standards, if appropriate in accordance with specified methods 4.3. Shut down equipment/instruments in accordance with operating procedures
5. Process and interpret data	5.1. Record test data noting atypical observations 5.2. Ensure calculated values are consistent with expectations 5.3. Record and report results in accordance with enterprise procedures 5.4. Estimate and document uncertainty of measurement in accordance with enterprise procedures, if required 5.5. Interpret trends in data and/or results and report out of specification or atypical results promptly to appropriate personnel 5.6. Determine if obvious procedure or equipment problems have led to atypical data or results
6. Maintain a safe work environment	6.1. Use established work practices and personal protective equipment to ensure personal safety and that of other laboratory personnel 6.2. Minimise the generation of wastes and environmental impacts 6.3. Ensure the safe collection of laboratory and hazardous waste for subsequent disposal 6.4. Care for and store equipment, used test pieces and back-up samples as required
7. Maintain laboratory records	7.1. Enter approved data into laboratory information management system (LIMS)

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ELEMENT	PERFORMANCE CRITERIA
	7.2. Maintain confidentiality and security of enterprise information and laboratory data 7.3. Maintain equipment and calibration logs in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • using instruments for qualitative and/or quantitative analysis • interpreting test methods and procedures • sample preparation procedures • performing calibration checks • metrology techniques underpinning test/procedure including estimating uncertainty • using instruments for qualitative and/or quantitative analysis • maintaining and evaluating reagents • troubleshooting basic equipment/method • preparing calibration graphs and calculating results using appropriate units and precision • applying theoretical knowledge to interpret gross features of data and make relevant conclusions such as identifying atypical results as out of normal range or an artefact • tracing and sourcing obvious causes of an artefact • recording and communicating results in accordance with enterprise procedures • maintaining security, integrity, traceability of samples, sub-samples, test data, results and documentation
Required knowledge
Required knowledge includes: • mechanical principles and concepts underpinning the test/procedure • purpose of tests • metrology techniques underpinning test/procedure • principles and concepts related to equipment/instrument operation and testing • function of key components of the equipment/instrument • effects on test of modifying equipment/instrument variables

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REQUIRED SKILLS AND KNOWLEDGE
• sample preparation procedures • basic equipment/method troubleshooting procedures • calibration procedures • calculation steps to give results in appropriate units and precision • enterprise and/or legal traceability requirements • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • interpret test methods/procedures accurately • prepare and test samples in accordance with specified methods • perform calibration checks (if required) • safely operate test equipment/instruments to enterprise standards and/or manufacturer's specifications • apply basic knowledge of physical properties of materials to interpret gross features of data and make relevant conclusions • identify atypical results, such as out of normal range or an artefact • trace and source obvious causes of an artefact • communicate problems to a supervisor or outside service technician • record and communicate results in accordance with enterprise procedures • maintain security, integrity and traceability of samples, sub-samples, test data/results and documentation.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment.

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EVIDENCE GUIDE	
	This unit of competency may be assessed with: • *MSL924001A Process and interpret data*. Resources may include: • standard laboratory equipped with appropriate test equipment/instruments, standards and materials • enterprise procedures and standard methods.
Method of assessment	The following assessment methods are suggested: • review of test data/results obtained by the candidate over a period of time to check accuracy, consistency and timeliness of results • review of test records and workplace documentation completed by the candidate • observation of candidate conducting a range of mechanical tests and sample preparation procedures • feedback from peers and supervisors • oral or written questioning of mechanical principles and concepts, test methods and enterprise procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Construction materials** A technical assistant is responsible for compressive strength testing of concrete cylinders. Typically, there are 20 to 30 to be tested each day. On arrival in the morning

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EVIDENCE GUIDE	
	the assistant records the maximum and minimum temperatures of the curing tanks, locates the particular cylinders to be tested and removes them from the tanks. She/he dries each cylinder, weighs it and measures its diameter and length using a comparator gauge. The ends are checked for excessive roughness and non-parallelism. She/he then starts the compression test machine and checks that the load pacer is set to the correct loading rate. She/he places a rubber cap on the finished end of each cylinder in turn and places it centrally on the platen of the load frame. The assistant closes the protective screen, applies load at the specified rate until failure occurs, and records the maximum load. After the cylinder has failed, the assistant removes it from the platen and checks for invalid failure modes. When this occurs (e.g. a shear failure) she/he puts the cylinder aside for further investigation. Any debris is removed from the platen and the next cylinder is tested. When all cylinders have been tested, the assistant cleans away any material left on the compression machine and switches it off. She/he enters all the data in into the laboratory information management system (LIMS) which calculates the unit mass and ultimate compressive strength of each cylinder. Finally, the assistant reviews the data for unusual or unexpected results that may indicate an error. **Manufacturing** A technician is asked to test a new polymeric material that is to be used to manufacture children's toys. The technician makes several representative test pieces and measures the elastic properties of the polymer as well as the durability of the polymer to flex many times without cracking. Because the polymer is to be used in a toy, the technician also dispatches samples of the polymer for chemical testing by a consulting laboratory to determine whether any toxic monomer could leach out if a child sucked the toy.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different

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RANGE STATEMENT	
work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS 1012 Methods of testing concrete
	  • AS 1289 Methods for testing soils for engineering purposes
	  • AS ISO 1000-1998 The international system of units (SI) and its application
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	  • AS/NZS ISO 9000 Set:2008 Quality management systems set
	  • ISO 5269 Pulps - Preparation of laboratory sheets for physical testing
	  • ISO 9142:2003 Adhesives - Guide to the selection of standard laboratory ageing conditions for testing bonded joints
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• calibration and maintenance schedules
	• data quality procedures
	• enterprise recording and reporting procedures
	• equipment startup, operation and shutdown procedures
	• material safety data sheets (MSDS)
	• material, production and product specifications
	• national measurement regulations and guidelines
	• principles of good laboratory practice (GLP)

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RANGE STATEMENT	
	• production and laboratory schedules • quality manuals, equipment and procedures manuals • SOPs
Mechanical principles and concepts underpinning the test/procedure	Mechanical principles and concepts underpinning the test/procedure may include: • matter, interatomic and intermolecular forces and states of matter • mass, weight, forces, pressure and energy • cohesive/adhesive forces, friction and slip resistance • elasticity, hardness, ductility, malleability, strength of materials, elastic limit, elastic moduli and ultimate stress • electrical concepts, including electric field, voltage, current, resistance and AC/DC • elasticity, hardness, strength of materials, plasticity, permeability and dispersion
Preparation of samples and test pieces	Preparation of samples and test pieces may include processes such as: • cutting • trimming • machining • etching
Mechanical tests and procedures	Mechanical tests and procedures may include: • adhesive strength • elastic properties and strength of materials • slip resistance and friction • viscosity and torque • creep and endurance • abrasion, hardness, impact, indent and penetration resistance • pressure and/or vacuum testing using manometers and load cells
Tests	Tests may include methods for: • control of starting materials, in-process materials and finished products • investigation of sources of construction materials

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RANGE STATEMENT	
	• basic troubleshooting of enterprise processes
Hazards	Hazards may include: • microbiological organisms and agents associated with soil • chemicals, such as acids and solvents • sharps and hand tools • flammable liquids and gases • cryogenics, such as dry ice and liquid nitrogen • fluids under pressure, such as steam and industrial gases • sources of ignition • disturbance or interruption of services • crushing, entanglement and cuts associated with moving machinery or falling objects
Hazard control measures	Hazard control measures may include: • ensuring access to service shut-off points • recognising and observing hazard warnings and safety signs • labelling of samples and hazardous materials • handling and storage for hazardous materials and equipment in accordance with labelling, MSDS and manufacturer's instructions • identifying and reporting operating problems or equipment malfunctions • cleaning equipment and work areas regularly using enterprise procedures • using personal protective clothing and equipment, such as hard hats, hearing protection, gloves, safety glasses, coveralls and safety boots • following established manual handling procedures • reporting abnormal emissions, discharges and airborne contaminants, such as noise, light, solids, liquids, water/waste water, gases, smoke, vapour, fumes, odour and particulates to appropriate personnel
Records	Records may include: • test and calibration results • equipment use, maintenance and servicing

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RANGE STATEMENT	
	history • faulty or unsafe equipment
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL975016A Perform complex tests to measure engineering properties of materials

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to prepare test specimens and perform multi-stage mechanical tests on them. The unit requires personnel to create test conditions that suit the materials intended use, optimise measurement procedures and recognise critical measurement points during the tests. The unit also covers data analysis and troubleshooting procedures/equipment that have led to atypical data or results.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory personnel in the construction materials, mining and manufacturing industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting, at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		
	MSL974012A	*Perform tests to determine the properties of construction materials*
		AND
	MSL973010A	*Conduct laboratory-based acceptance tests for construction materials*
		OR
	MSL973001A	*Perform basic tests*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Interpret and schedule test requirements	1.1. Review test request and sample documentation to identify required test parameters and intended use of bulk material

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ELEMENT	PERFORMANCE CRITERIA
	1.2. Identify hazards and enterprise control measures associated with the sample, preparation/testing methods and equipment 1.3. Inspect samples, compare with specifications, record and report discrepancies 1.4. Liaise with client when samples and/or request forms do not comply with enterprise procedures 1.5. Match required parameters with suitable test methods, available equipment and instrument specifications 1.6. Plan parallel work sequences to optimise throughput of multiple sets of samples, as required
2. Prepare and measure test specimens	2.1. Prepare test specimens in accordance with test method 2.2. Conduct preliminary measurements to establish initial dimensions and conditions 2.3. Store test specimens and residual sample materials to maintain their integrity
3. Check equipment before use	3.1. Set up equipment/instruments in accordance with test method 3.2. Perform pre-use and safety checks in accordance with enterprise procedures and manufacturers specifications 3.3. Identify faulty or unsafe components and equipment and report to appropriate personnel 3.4. Check calibration status of equipment and quarantine out of calibration or faulty items
4. Test samples	4.1. Position and secure test specimen in test equipment/instrument 4.2. Conduct preliminary measurements to determine optimum test conditions and instrument settings 4.3. Perform each measurement stage in sequence, terminating each stage at the appropriate end point 4.4. Record all test measurements, observations and factors that may impact on quality of results 4.5. Remove test piece and conduct post-test measurements 4.6. Shut down equipment and store used test pieces in accordance with enterprise procedures
5. Process and analyse data	5.1. Confirm data is the result of valid measurements 5.2. Perform required calculations and ensure results are

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ELEMENT	PERFORMANCE CRITERIA
	consistent with estimations and expectations 5.3. Record results with the appropriate accuracy, precision and units 5.4. Estimate and document uncertainty of measurement in accordance with enterprise procedures, if required 5.5. Analyse trends in data and/or results and report out of specification or atypical results promptly to appropriate personnel 5.6. Troubleshoot procedure or equipment problems which have led to atypical data or results
6. Maintain a safe work environment	6.1. Use established safe work practices to ensure personal safety and that of other laboratory personnel 6.2. Minimise the generation of wastes and environmental impact 6.3. Ensure the safe disposal of laboratory wastes 6.4. Clean, care for and store equipment and consumables in accordance with enterprise procedures
7. Maintain laboratory records	7.1. Enter approved data and results into laboratory information management system 7.2. Maintain security and confidentiality of enterprise information and laboratory data 7.3. Maintain equipment and calibration logs in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • interpreting client requests, complex tests and sample preparation methods accurately • applying enterprise procedures • planning work sequences involving multiple/parallel tasks • interpreting safety information, such as material safety data sheets (MSDS) and working safely

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REQUIRED SKILLS AND KNOWLEDGE

- checking and using test equipment in accordance with enterprise procedures
- maintaining concentration and applying multi-stage test methods accurately
- estimating/calculating scientific quantities (e.g. total and effective stress, strain and pressure)
- using calibration charts
- interpreting significant features of data and graphs and making logical conclusions
- identifying atypical data, errors and unexpected results and tracing any obvious causes
- recording and presenting results accurately and legibly
- maintaining security, integrity and traceability of all samples/test pieces, data/results and technical records
- cleaning and maintaining equipment
- seeking advice from a supervisor
- communicating with clients or outside service technician
- demonstrating a professional approach and positive company/organisation image

Required knowledge

Required knowledge includes:

- complex test methods routinely used in job role, including:
  - purpose and principles of test
  - relationship between the engineering properties and uses of construction materials
  - key sample preparation stages
  - key treatment/measurement stages
  - calculation steps to give results in appropriate units and precision
  - expected values for sample type
  - sources of uncertainty and methods for their control
- principles and concepts underpinning the test method, such as:
  - stress, strain, pressure, total and effective stress, fatigue, creep, failure modes of materials, strength/consolidation of materials and permeability
  - electrical safety concepts including voltage, current, resistance, conductors/insulators and AC/DC
- principles and concepts related to equipment/instrument operation including the function of key components and effects on test of modifying variables
- pre-use checks and operating procedures for test equipment/instruments routinely used in job role
- basic equipment/method troubleshooting procedures
- enterprise and/or legal traceability requirements for samples, test pieces, test data and results
- procedures for recording and reporting test results, calculations, test observations

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REQUIRED SKILLS AND KNOWLEDGE
and unexpected or atypical results and equipment problems • health, safety and environmental management requirements relevant to job role • confidentiality requirements relevant to job role

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • select test methods, operating parameters and test ranges to suit the material and its intended use • prepare and orient test pieces precisely • safely set up, start up and shut down equipment • maintain close attention to measurement procedures, accuracy and precision during lengthy complex tests • calculate/determine required engineering properties with appropriate accuracy, precision and units • recognise atypical data/results and trace artefacts and problems with procedures or equipment • record and report data/results in accordance with enterprise procedures • maintain security, integrity and traceability of all samples, test pieces and documentation.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL925001A Analyse data and report results*. Resources may include: • engineering materials testing laboratory with appropriate test equipment, instruments and samples • SOPs and test methods.
Method of assessment	The following assessment methods are suggested: • review of results obtained by the candidate over a

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EVIDENCE GUIDE	
	period of time to ensure accurate and consistent results are obtained within required timelines • inspection of testing records and workplace documentation completed by the candidate • observation of candidate conducting a range of complex tests on engineering materials • feedback from clients, peers and supervisors • oral or written questioning. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Construction materials** A consulting company is investigating a possible dam site and needs to assess a particular soil in the foundation. They request a geotechnical testing authority to determine the permeability of the soil. A senior technician checks the client request and inspects the soil sample, noting that it is plastic, clay and fissured. He/she checks the dam design parameters and notes that the overburden pressure will be 500 kPa. The senior technician uses a triaxial permeability test using a constant head configuration. He/she trims a cylindrical test piece, determines the sample's bulk density and uses the trimmings to determine its moisture content. The test piece is mounted in a triaxial test cell and the equipment carefully de-aired. All pressure gauges, regulators and transducers are checked and the

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EVIDENCE GUIDE	
	equipment is leak tested. A confining stress is applied and after allowing the sample to come to equilibrium, it is back saturated. The cell pressure is increased to 500 kPa and as the sample consolidates, the technician monitors the sample volume change and pore water pressure. A differential pressure is applied in stages and the water flow through the sample is optimised. After reaching a steady state the flow rate is monitored to determine the sample permeability. After taking sufficient readings to ensure a valid measurement, the senior technician prepares plots of permeability and time and reports the steady state values. After completing the test, he/she shuts down the equipment in the recommended sequence, cleans and restores all items. He/she then removes the test piece and determines the after-test moisture content.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories
	  • AS 1289 Methods of testing soils for engineering
	  • AS 1012 Methods of testing concrete
	  • AS 2981 Methods of sampling and testing

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RANGE STATEMENT	
	asphalt • DIN 19683 series - Soil testing in agricultural hydrology - Physical laboratory tests • ISO/IEC Guide 98-3:2008 Uncertainty of measurement - Part 3 Guide to the expression of uncertainty in measurement (GUM) • National Association of Testing Authorities (NATA) supplementary requirements for the relevant field of testing • NATA technical notes and guides • MSDS • standard operating procedures (SOPs) • quality manuals, equipment and procedures manuals • equipment startup, operation and shutdown procedures • calibration and maintenance schedules • enterprise recording and reporting procedures • production and laboratory schedules • material, production and product specifications
Preparation of samples	Preparation of samples may include: • moisture conditioning and compaction of soil • trimming to required size and shape • orientation of test pieces • polishing • curing concrete test pieces
Test methods and procedures	Test methods and procedures may include: • consolidation of soil (e.g. one-dimensional and triaxial) • shear testing of soil and rock (e.g. total stress, effective stress, direct stress and triaxial stress) • permeability of soil, rock and concrete (e.g. falling head and constant head) • California Bearing Ratio (CBR) (4 point) • fatigue and creep of metals, polymers and concrete • wheel tracking in asphalt • stiffness and creep of asphalt

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RANGE STATEMENT	
Hazards	Hazards may include: • microbiological organisms and agents associated with soil • chemicals, such as acids and solvents • sharps and hand tools • flammable liquids and gases • cryogenics, such as dry ice and liquid nitrogen • fluids under pressure such as steam and industrial gases and hydraulics • disturbance or interruption of services • crushing, entanglement and cuts associated with moving machinery or falling objects
Hazard control measures	Hazard control measures may include: • ensuring access to service shut-off points • recognising and observing hazard warnings and safety signs • labelling of samples, hazardous materials and equipment • machinery guards • handling and storage for hazardous materials and equipment in accordance with labelling, MSDS and manufacturer's instructions • identifying and reporting operating problems or equipment malfunctions • cleaning equipment and work areas regularly using enterprise procedures • using personal protective clothing and equipment, such as hard hats, hearing protection, gloves, safety glasses, coveralls and safety boots • following established manual handling procedures • reporting abnormal emissions, discharges and airborne contaminants such as noise, light, solids, liquids, water/waste water, gases, smoke, vapour, fumes, odour and particulates to appropriate personnel
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management

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RANGE STATEMENT	
	requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSS015002A Develop strategies for more sustainable use of resources

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers identifying strategies for more sustainable uses of resources. The unit includes the identification of waste as defined in lean manufacturing (muda) as part of a strategy for achieving better sustainability outcomes in a process as well as quantifying theoretical and actual resource (including energy) consumption.

Application of the Unit

This unit applies inside organisations and their value chains and specifically applies to the use of resources as part of an overall response to improving sustainability. The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

The unit assumes that a decision to attempt to achieve more sustainable use of resources has already been made. The unit covers the skills needed for developing a strategic approach to resource use at the organisation or value chain level.

The unit does not cover the technical skills required to implement specific initiatives that may be identified as part of the strategic plan. However, there is a requirement to present and organise data. The complexity of this requirement will vary according to the type and scale of the organisation's processes. Where required, appropriate mathematics and statistics units should be selected from the MEM05 Metal and Engineering Training Package or other appropriate Training Package.

Where the carbon footprint (or water footprint or similar) of an enterprise or value chain is known, the unit can be applied to developing strategies for the reduction of that footprint.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility.

For specific techniques covering the auditing of water, energy, emissions and transport, refer to relevant sustainability audit units.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Quantify resource consumption	1.1 Identify all significant resources used by process
	1.2 Identify consumption measurements available for each resource
	1.3 Determine consumption for each resource
2 Quantify resource loss	2.1 Determine theoretical consumption of each resource
	2.2 Compare theoretical consumption with actual consumption
	2.3 Determine loss (emission) for each resource
3 Recommend strategies for reducing waste	3.1 Short-list high emission process steps
	3.2 Analyse process to identify emission steps or locations
	3.3 Determine root cause of emission
	3.4 Investigate methods for reducing emission
	3.5 Develop strategies and recommendations for improvement
4 Prepare resources use audit report	4.1 Identify purpose of report and key stakeholders
	4.2 Compile data, implications and recommendations
	4.3 Consult with stakeholders as appropriate
	4.4 Draft and present report

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Required Skills and Knowledge

Required knowledge includes:

- the concept of muda. Muda is usually summarised under the headings of the ‘seven wastes’ which include:
  - overproduction
  - delay/waiting
  - transportation
  - over processing
  - excess inventory
  - unnecessary motion
  - defects and rework
- methods of material balancing
- methods of energy balancing
- methods of comparing theoretical with actual resource consumption
- methods for mapping manufacturing processes and resources consumed
- methods of measuring actual resource usage
- concept of muda and muda categories
- muda reduction methods and strategies
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- calculating, manipulating and interpreting numerical data, including establishing series, means and averages, absolute and proportional material and energy usage per product or process, correlations and rates of change
- analysing and conducting root cause analysis
- calculating theoretical consumption of resources as the minimum amount of resources per product or process step as defined by the customer multiplied by the rate of production or process
- calculating actual consumption of resources per unit (e.g. per product, operation, site or value chain)
- writing technical reports
- consulting with technical experts and internal and external stakeholders

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to identify and quantify resources and waste in a process, recommend strategies to reduce waste and prepare a report with recommendations.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • quantifying significant resource consumption and emission using materials balancing • identifying and consulting with stakeholders • developing strategies for reducing emissions • preparing and presenting a resources use report.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Waste	Waste in this unit is used in the broader sense of 'muda' as used in lean manufacturing and the competitive manufacturing units of competency developed by Manufacturing Skills Australia (MSA)

Emissions	Emissions means all materials which enter the process/site but which do not leave as part of the product and so includes:
	• known or able to be physically measured emissions of:
	  • gases, vapours and fumes
	  • liquids
	  • solids
	• assumed emissions through material balancing
	• assumed emissions through energy loss, including heat, friction and other energy conversion yield losses

Theoretical consumption	Theoretical consumption of resources is the minimum amount of resources per product as defined by the customer multiplied by the rate of production
Actual consumption	Actual consumption is the amount of a resource entering the value chain
Significant resources	Significant resources includes resources which are deemed to be significant because they are: • high volume • high value • high environmental significance • important to the product or process • covered by legislation or regulation • important to the enterprise It need not include resources which are incidental to the activity and which are not otherwise significant

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015015A Evaluate sustainability impact of a process

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers evaluating the impact on sustainability of an entire process (manufacturing, logistics, office or other process) or the product from such a process. It does not specifically address the regulatory requirements for an environmental impact statement.

Application of the Unit

This unit applies to establishing the overall or broad sustainability impact of a process and making recommendations for mitigating negative sustainability impacts. It may apply to value chains beyond the boundary of an organisation, or the entire value chain within an organisation. The unit scope includes products made, services offered, and use of sites by an organisation or part or all of its value chain. This unit covers the application to substantial portions of value chains and may be beyond the boundaries of the organisation. For portions of value chains within an organisation consider MSS014002A Evaluate sustainability impact of a work or process area.

Environmental sensitivities referred to in this unit are at the issue level. The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit.

If the impact is to be evaluated across a value chain and the extent of the value chain is not known, MSACMS601A Analyse and map a value chain should also be selected.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Evaluate the value chain for the selected process	1.1 Select portion of the value chain for analysis
	1.2 Identify process steps along the chain
	1.3 Identify the change which occurs at each step
	1.4 Define the interactions with the environment at each step
2 Determine sustainability issues for the process	2.1 Identify environmental sensitivities at each step in the value chain
	2.2 Identify other sustainability issues at each step in the value chain
	2.3 Short-list sustainability issues which will require action to mitigate or eliminate negative sustainability impacts
3 Analyse sustainability issues for the process	3.1 Determine root cause of each short-listed issue
	3.2 Develop possible solutions to root causes
	3.3 Develop alternative mitigation strategies where needed
	3.4 Estimate resources required for solutions and alternative mitigation strategies
	3.5 Rank possible solutions strategies by desirability
	3.6 Produce and present report to stakeholders

Required Skills and Knowledge

Required knowledge includes:

- value chain mapping and analysis with regard to sustainability
- process and changes which occur within the process

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- environmental impacts of materials and energy used/emitted
- environmental sensitivities of all areas impacted by the value chain (and related areas where impact spreads beyond immediate area, e.g. by loss of containment)
- root cause analysis and problem solving
- mitigation strategies
- benefit/cost analyses techniques
- methods of dealing with sustainability issues and the benefits arising from each
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- analysing and prioritising issues
- consulting and negotiating with stakeholders on possible solutions and strategies for sustainability improvement
- using problem-solving techniques, including root cause analysis
- mapping the value chain

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to evaluate the sustainability impact of a whole process or internal or external value chain, determine root cause for sustainability issues and propose and rank solutions.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • identifying steps in the process and portion of manufacturing value chain • determining ecological and sustainability impacts of processes • determining root causes of impacts • evaluating solution and mitigation strategies.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Process	Process may include: • any operational, manufacturing, logistics, administrative, information technology or business process in a manufacturing value chain (e.g. manufacturer, supplier of goods or services or a customer)
Interactions with the environment	Interactions with the environment may include: • drawing physical resources from the environment • releasing materials to the environment (e.g. emissions) • drawing energy from/releasing energy to the environment
Environmental sensitivities	Environmental sensitivities may include: • fragile areas and rare or threatened species • heritage or religious issues • hazardous emissions • regulated emissions or other regulatory issues • community perceptions or other issues

Sustainability issues	Sustainability issues may include:
	• resource footprint (e.g. carbon and water) of product and process
	• current and future availability of raw materials
	• current and future availability of energy
	• waste generation and disposal
	• efficiency of process
	• the extent to which the production process and product affects the environment, including effects on:
	  • climate
	  • quality of local air and water
	  • ecology
	  • noise
	• relationship with the local and broader community (e.g. effect of operations on aesthetic appearance, preservation of heritage, and proximity to schools and religious facilities)
	• extent of regulatory oversight and cost of compliance

Desirability ranking	Desirability ranking includes: • direct dollar benefit/cost • customer benefit • stakeholder perception:

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	• shareholders • employees • community • financial community • other • life cycle improvements

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS402001A Apply competitive systems and practices

Modification History

New unit, superceding MSACMS200A Apply competitive manufacturing practices - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to implement basic improvement practices within an organisation using competitive systems and practices. The unit focuses on bringing together the basic concepts and the holistic application of these basic concepts and processes to operations. It would typically be carried out working as part of a team.

Application of the Unit

This unit applies to an individual in an organisation that has embarked on competitive systems and practices. The unit covers the skills and knowledge required to contribute to the competitive systems and practices processes and assumes that they are to be used within the scope of the individual's job and authority.

This unit requires the application of skills associated with planning and organising an individual's own role within the competitive systems and practices framework.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of

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performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Identify own place in the value chain	1.1	Identify customers relevant to own work and their needs/requirements
		1.2	Identify suppliers for own work
		1.3	Identify value contributions along the chain
		1.4	Identify and recommend methods of increasing own contribution to the value chain
2	Improve the product and process value	2.1	Identify customer features/benefits in the product and process
		2.2	Identify aspects of product and process which contribute to customer features/benefits
		2.3	Identify aspects of product and process which do not contribute to customer benefits/features
		2.4	Recommend methods of reducing waste and increasing features/benefits
3	Use competitive systems and practices	3.1	Identify competitive systems and practices used in organisation and own work area
		3.2	Apply practices appropriate for the job or process
		3.3	Monitor the job/process and make adjustments to improve it in accordance with procedures
		3.4	Identify own skill requirements and seek skill development, if required

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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating with others to clarify scope of competitive systems and practices implementation and contributing suggestions for improvement
- visualising normal operational procedures in terms of flow and contribution to customer outcomes
- planning own tasks to support competitive systems and practices implementation
- implementing competitive systems and practices in own work area according to instructions
- identifying waste (muda)

Required knowledge

Required knowledge includes:

- internal and external customers and the value they derive from operations
- suppliers, their capabilities and contribution to value (this may be obtained from an existing value stream map or other enterprise documentation)
- waste (muda)
- relevant competitive systems and practices for own job and how to apply them
- factors impacting on product, operations and waste, particularly those wholly or partially under their control (and how to control them)

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person being assessed against this unit will work effectively in a competitive systems and practices environment, making continual positive contributions to the improvement of the business within the scope of their job.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the scope of competitive systems and

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	practices implemented in their work area • identify services and/or functions supplied by suppliers and to customers • identify own tasks and responsibilities and relate them to organisation and customer requirements • identify aspects of products and process which add to or detract from customer benefit • contribute suggestions for improvement.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads, and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.

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Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control And Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted

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	so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Customers	Customers may include: • internal or external customers and should be sufficiently close to the individual's work as to be easily identifiable • final customers used as the basis for the identification of value and waste The individual does not need to interface directly with the external customer, but should be provided with sufficient information to enable them to identify customer benefits and customer features
Suppliers	Suppliers may be: • internal or external suppliers and should be sufficiently close to the individual's work as to be easily identifiable The operator does not need to interface directly with external suppliers, but should be provided with sufficient information to enable them to identify supplier contribution to their own work and to customer benefit
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the organisation • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) and government regulations Procedures may be: • written, verbal, computer-based or in some other format

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Unit Sector(s)

Unit sector	Competitive systems and practices

Custom Content Section

Not applicable.

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MSS402002A Sustain process improvements

Modification History

New unit, superseding MSACMS201A Sustain process improvements - Not equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to prevent process improvements in their own work from slipping back to former practices or digressing to less efficient practices.

Application of the Unit

This unit applies to organisations implementing competitive systems and practices and continuous improvement. It covers the skills needed to ensure that process improvements are sustained and opportunities taken to suggest further improvements.

Improvement initiatives can be made by any of a number of methods and by teams or individuals. The unit assumes that desired levels of performance or quality are known to employees.

The unit can be applied to all areas of an organisation, including production, maintenance, logistics and office functions.

This unit requires the application of skills associated with problem solving, initiative and enterprise and self-management in order to understand implement and monitor improvement practices. It also requires the ability to identify and address personal skill gaps in order to manage own ability to implement change.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the Performance criteria describe the performance needed to

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essential outcomes of a unit of competency.	demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Examine previous improvements	1.1	Identify impact of previous process improvements to equipment, operations, services or products in own work area
		1.2	Identify improvements where objectives have not been met
2	Implement corrective actions	2.1	Identify corrective actions that can be taken by self on process improvements that have not met objectives
		2.2	Obtain any required approvals
		2.3	Identify any additional, personal skill gaps and seek skill development
		2.4	Adopt improved processes
3	Check changes	3.1	Identify claimed improvements
		3.2	Identify methods of observing and measuring claimed improvements in own work area
		3.3	Check if claimed improvements are occurring and report problems in accordance with procedures
4	Check for further improvements	4.1	Look for areas of possible further improvement
		4.2	Discuss further improvements with peers and supervisors
		4.3	Take action to implement improvements in accordance with procedures

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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating with others to clarify scope and stage of implementation of competitive systems and practices and contribute suggestions for further improvements in implementation
- visualising normal operational procedures in terms of flow and contribution to customer outcomes
- planning own tasks to support competitive systems and practices implementation
- implementing competitive systems and practices in own work area according to instructions
- identifying waste (muda)
- monitoring competitive systems and practices performance indicators in own work and work area

Required knowledge

Required knowledge includes:

- internal and external customers and the value they derive from own work area operations
- suppliers to own work area, their capabilities and contribution to customer benefit
- waste (muda)
- relevant competitive systems and practices for own job and how to apply and monitor the outcomes
- factors impacting on product, operations and waste, particularly those wholly or partially under their control (and how to control them)

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person being assessed against this unit will be able to demonstrate their willing adoption of new equipment, processes, procedures and practices as well as their

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	expertise at implementing them and making critical reviews of their performance in line with their level of competence and authority.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • implement and monitor process improvements in own work area against objectives • contribute suggestions for further improvement/s • apply procedures for seeking approvals and reporting non-conformances.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made

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	to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA)software, Enterprise Resource Planning (ERP)systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts

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	• standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and industry sector
Customers	Customers may be: • internal or external customers and should be sufficiently close to the individual's work as to be easily identifiable • final customers used as the basis for the identification of value and waste The individual does not need to interface directly with the external customer, but should be provided with sufficient information to enable them to identify customer benefits and customer features
Suppliers	Suppliers may be: • internal or external suppliers and should be sufficiently close to the individual's work as to be easily identifiable The operator does not need to interface directly with external suppliers, but should be provided with sufficient information to enable them to identify supplier contribution to their own work and to customer benefit
Measuring improvements	Measuring improvements may include: • personally taking measurements • arranging for measurements to be taken/made by appropriate personnel
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipe • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing

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	practice (GMP) and responsible care) and government regulations Procedures may be: • written, verbal, computer-based or in some other format
Improvements	Improvements include: • techniques for preventing mistakes by designing the operations process, equipment and tools so that an operation literally cannot be performed incorrectly (e.g. baka-yoke) • techniques that generate warning signals were a mistake is about to be performed (poka-yoke)

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS402010A Manage the impact of change on own work

Modification History

New unit, superseding MSACMC210A Manage the impact of change on own work - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required by an employee to effectively manage the changes in their own work resulting from their organisation's implementation of competitive systems and practices.

Application of the Unit

This unit applies to an employee in an organisation implementing competitive systems and practices that affect the employee's own work. The unit includes the skills required to positively participate in ongoing and continuous change as it affects their work. The employee will be expected to deal with these changes as part of a team and to give feedback from their own perspective.

This unit requires the application of skills associated with problem solving, planning and organising and self-management for assessing and managing the impact of change on own work. This unit also requires the ability to seek information and feedback from team members on the impact of changes and suggested improvements.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of

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performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Examine the impact of change on own work practices	1.1	Identify competitive systems and practices relevant to changes in own work
		1.2	Examine changes to work flow
		1.3	Examine changes to equipment/process/physical environment
		1.4	Examine changes to work relationship with team members and other teams
		1.5	Examine changes to data collection needs
		1.6	Examine changed work for impacts on health, safety and environment (HSE)
		1.7	Examine changes to quality requirements
		1.8	Identify any additional individual skill needs
		1.9	Identify other areas requiring assistance
2	Implement change	2.1	Review changes which may have an adverse impact with team leader
		2.2	Adopt changes to individual work practice
		2.3	Seek assistance in gathering/processing data, as required
		2.4	Implement the data collection/processing and take actions on resulting information in accordance with procedures
		2.5	Seek assistance/training to meet needs caused by change
3	Implement continuous	3.1	Critically examine all changes
		3.2	Identify impacts of changes both up and down the

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improvement		immediate value stream
	3.3	Identify areas for improvement
	3.4	Make recommendations for improvement in accordance with procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying the competitive systems and practices being implemented in the organisation that are relevant to own work, including, if implemented:
  - Just in Time (JIT) and kanban systems
  - preventative maintenance
  - 5S housekeeping
  - continuous improvement processes (e.g. kaizen)
  - waste (muda) elimination
  - formal problem solving procedures (e.g. root cause analysis (RCA))
- analysing own work procedures
- communicating with others in work area, team leaders and other employees relevant to changes in own work
- solving problems relevant to changes in own work
- identifying sources of assistance in organisation if difficulty is experienced with changes
- interpreting relevant procedures and instructions
- working as part of a team

Required knowledge

Required knowledge includes:

- features of common competitive systems and practices sufficient for identification, including:
  - JIT and kanban systems
  - preventative maintenance
  - 5S housekeeping
  - continuous improvement processes (e.g. kaizen)

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  - waste (muda) elimination
  - formal problem solving procedures (e.g. RCA)
- current processes and principles of operation
- sources of data on the process/plant and possible applications to information
- methods of determining own skill needs and developing skills, if required
- HSE principles as relevant to own job
- change implementation contacts and procedures relevant to work area
- employee assistance mechanisms in the organisation

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the competitive systems and practices used in their own work • identify changes to their own work flowing from the implementation of the relevant competitive systems and practices • implement changes • know when and how to seek assistance with work changes • make suggestions for improvements.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess response to

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	contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on. • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems Control and Data Acquisition (SCADA)

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	software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Managing impact of change	Managing impact of change may include: • elements being undertaken individually or as part of a team • seeking assistance from team leaders for areas outside the employee's range of responsibility and authority
Procedures	Procedures may include: • all work instructions • standard operating procedures • formulas/recipes • batch sheet • temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing

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	practice (GMP) and responsible care) and government regulations Procedures may be: • written, verbal, computer-based or in some other format
Gathering and monitoring performance data	The gathering and monitoring of performance data may be: • undertaken manually by individual employees through charts, tally sheets or keypad/board entry • collected automatically through software, such as SCADA software, ERP systems, MRP and proprietary systems
Continuous improvement	Continuous improvement in competitive systems and practices (often referred to as kaizen) includes: • the continual evaluation and improvement of all process in terms of time required, resources used, resultant quality, and other aspects relevant to the process
Value stream	The value stream begins with the customer and includes all actions (both value adding and non-value added) by both internal sections/departments and external organisations to meet a customer requirement. Depending on the operations and the customer requirement stages where value stream actions may occur include: • sales outlet/representative • information gathering, data analysis and research • product design • raw material sourcing • intermediate processing • final assembler/collation/preparation • support services (e.g. accounting, finance and legal) • storage and delivery to customer • after market support

Unit Sector(s)

Unit sector Competitive systems and practices

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Custom Content Section

Not applicable.

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MSS402020A Apply quick changeover procedures

Modification History

New unit, superseding MSACMT220A Apply quick changeover procedures - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to apply quick changeover procedures in an organisation implementing competitive systems and practices.

Application of the Unit

This unit applies to individuals in an organisation which is implementing competitive systems and practices and is pursuing quick changeover as one of its competitive operations tools. The unit can apply to quick changeovers of equipment, processes, batches or product type.

This unit covers the carrying out of these quick changeovers and also recommending improvements within the scope and authority of the individual's job.

Particular technical skills may also be required in some operations sectors and for some jobs. These skills should be gained from the Training Package relevant to the individual's industry and occupation.

This unit requires the application of skills associated with applying quick changeover procedures, including the planning and organising of own work, identifying problems and making suggestions for improvement of procedures.

This unit may not be applicable to a totally continuous operation producing only the one product, or simultaneous range of products. The unit is also not applicable to a maintenance/PVI shutdown as experienced by the continuous process manufacturers. However, where there is continuous operation on a campaign basis, it may be applied to the changeover between campaigns or similar changeovers.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Prepare for changeover	1.1	Determine when changeover will be required
		1.2	Review plans and instructions for quick changeover
		1.3	Identify role of others in quick changeover
		1.4	Obtain all required tools/parts/materials for changeover
		1.5	Organise process and tools/parts/materials ready for changeover
2	Make quick changeover	2.1	Plan changeover according to quick changeover principles
		2.2	Liaise and work with relevant people in quick changeover
		2.3	Complete changeover according to procedures
		2.4	Check output meets specification
		2.5	Debrief with all relevant stakeholders
		2.6	Note any steps which cause a problem
		2.7	Recommend changes to problematic steps
3	Improve occupational health and safety	3.1	Identify hazards to self or others in all steps/actions
		3.2	Determine risks from each hazard

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(OHS)	3.3	Identify actions which may be performed in a more ergonomic manner
	3.4	Recommend changes to improve OHS

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- determining/predicting when a changeover will occur through knowledge of products and processes in own work area
- communicating with others to clarify scope and procedures for quick changeover and contributing suggestions for improvement
- planning own tasks in quick changeover
- identifying and working to target changeover time
- working as part of a team
- setting up quick changeover using appropriate tools, process skills and procedures
- following OHS procedures and regulatory requirements and notifying risks

Required knowledge

Required knowledge includes:

- principles of quick changeover, including:
  - setting of target time for changeover
  - conversion of internal set-up time to external set-up time, where appropriate
  - simplification of changeover steps
  - monitoring and continuous improvement of changeovers
- relevant operational procedures
- target time for changeover
- relevant OHS regulations and requirements
- purposes/requirements of changeover
- methods of recommending changes
- quality requirements for products and processes
- minimisation of changeover waste (e.g. scrap and energy)

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the scope and equipment to be used in a quick changeover implemented in their work area • identify the target time • understand the difference between internal and external changeover steps • identify own tasks and responsibilities in a quick changeover • identify problems in quick changeovers • contribute suggestions for improvement.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess response to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on)

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	• targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S

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	• continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Changeover	Changeover may refer to: • an exchange of equipment (often dies or tools (traditional)) • a change between products/batches or between campaigns or processes. It may be any quantum change to produce a different product or undertake a different process In competitive systems and practices equipment-based quick changeover techniques in manufacturing can often be referred to under different names, for example: • single minute exchange of die (SMED) – The term originated with die changeovers but now often refers to the ability to perform any set-up activity in a minute or less of machine or process downtime • single-digit set-up – performing a set-up activity in a single-digit number of minutes (i.e. fewer than ten) • one touch exchange of die (OTED) – literally, changing a die with one physical motion, such as pushing a button; broadly, an extremely simple procedure for performing a set-up activity
Set-up	Set-up can be divided into two types: • internal set-up (work that can be done only when the machine or process is not actively engaged in production) • external set-up (work that can be done concurrently

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	with the machine or process performing production duties) The same distinction can be applied to non-production equipment-based work areas where changeovers of processes or operations can be: • internal (requires work to stop, be reset, computers restarted, and so on) • external (where work can continue during the changeover)
Set-up time	Set-up time includes: • the work time required to change over a machine or process from one item or operation to the next item or operation
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of operations, processes, plant and equipment • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) and government regulations Procedures may be: • written, verbal, computer-based or in some other format

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS402021A Apply Just in Time procedures

Modification History

New unit, superseding MSACMT221A Apply Just in Time (JIT) procedures - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to work in an organisation implementing Just in Time (JIT) procedures.

Application of the Unit

This unit applies to an individual working in an organisation following JIT who will need to follow procedures which are specific to JIT, such as the controlled flow of material (e.g. the use of kanban and elimination of waste). This will involve the individual in the application of the pull system to their job and the authorisation of product/material flows in accordance with procedures and their level of authority.

This unit requires the application of skills associated with planning and organising and self-management to deliver product on demand using necessary tools, equipment and processes to meet production requirements. The unit also requires an ability to recognise and act on problems that may interfere with meeting production demands.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

1	Respond to indicator of demand	1.1	Identify pull of product through work role
		1.2	Recognise indicator of flow authorisation
		1.3	Identify production or service required
2	Make products or deliver service to demand	2.1	Make product or deliver service as required by ticket
		2.2	Identify any factors likely to prevent demand being satisfied in own work or work of the team
		2.3	Take action in accordance with procedures
3	Update demand information as required	3.1	Record information on ticket to procedures, as required
		3.2	Facilitate operation of flow authorisation as part of work
4	Recommend improvements	4.1	Examine the operation of the JIT system as it relates to own work
		4.2	Identify areas for improvement
		4.3	Identify any additional personal skill requirements to implement JIT procedures
		4.4	Recommend improvements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

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- receiving ticket, kanban, order or other indicator of demand and interpreting correctly for own work function, including quantity, quality, time and delivery requirements
- ensuring that all production and movement of parts/material or delivery of a service for which the individual is responsible for takes place only as required by a downstream operation
- recognising and taking appropriate action on faults and other issues that may threaten the JIT delivery of own product or service
- reading and recording information on tickets or other indicators of demand
- suggest improvements to JIT system, as appropriate
- performing technical functions to meet indicators of demand from downstream and to issue indicators of demand upstream

Required knowledge

Required knowledge includes:

- relevant indicator of demands for own job
- own role in flow authorisation
- JIT methods relevant to job
- procedures for recommending improvements

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the indicators of demand and the flow authorisation system in their work area • relate products and services supplied by suppliers and customers to the flow authorisation system • identify own tasks and responsibilities and relate them to the flow authorisation system • interpret received indicators of demand correctly for quantity, quality and time of delivery • contribute suggestions for improvement.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices.

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	Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess response to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using some combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work

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environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
JIT	JIT is a scheduling concept that calls for any item or service needed for an operation, whether a service, raw material, finished item, or anything in between to be available:

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	• precisely when the service, product or operation is to be produced or undertaken • in the right quantity and at the right quality
Product	Product may include: • a physical product • a supporting utility service, such as water, gas, power • some other service (e.g. cranes and forklifts)
Flow authorisation	Flow authorisation refers to: • a system which authorises the worker to make a product without reference to another authority
Indicator of demand	An indicator of demand may include: • kanban bin, ticket or similar • some other indicator of demand pull which authorises production or movement of an item (in some plants, this may also include authorisation using SCADA software) In continuous operations organisations, production is measured in terms of production rate (e.g. kg/h, tonne/day) and rate is increased/decreased according to the flow authorisation which may be a kanban (e.g. ticket, order from a supplier) or may be a SCADA signal from a remote facility (e.g. customer tank) saying that resupply is required or similar
Ticket	A ticket may include: • kanban or some other record, paper or electronic, which constitutes the whole or part of the flow authorising system (where kanban bins are used, there may be no other record)
Kanban	Kanban refers to: • a card or sheet used to authorise production or movement of an item and may vary in format or content between organisations and departments
SCADA	SCADA refers to: • a number of systems which automatically collect critical process data, perform required mathematical manipulations on it and then make control decisions and/or give required information to personnel for action
Pull system	A pull system refers to:

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	• an operations planning system based on making on demand, as opposed to a push system based on making for stock using a sales forecast
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) and government regulations Procedures may be: • written, verbal, computer-based or in some other format

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS402030A Apply cost factors to work practices

Modification History

New unit, superseding MSACMT230A Apply cost factors to work practices - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required by an individual to identify cost components in their work and to be able to determine, in general terms, the cost impacts of alternative actions.

Application of the Unit

This unit applies to an individual who is required to contribute to, and be involved in, the assessment of cost factors in their work. This may be done individually or in a team environment.

The unit covers the skills to be able to assess the relative costs of the alternatives and use this as one of the key factors in making decisions. Decisions are made within the scope of the employee's authority and according to procedures. Typical decisions include those that contribute to the efficient organisation of own work and the improvement of production time and cycle times.

This unit requires the application of skills associated with problem solving to identify cost factors and cost implications of own work and self-management to apply cost-effective practices.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised

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unit of competency.	text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Identify the major cost components of product or process in own work area	1.1	Identify cost components in the product or process in own work area
		1.2	Recognise the impact of current or alternative actions on costs
2	Identify constraints to cost-efficiency	2.1	Identify required production/process rate and major costs
		2.2	Identify costs factors under individual or team control
		2.3	Relate identified costs factors to impact on overall cost of production/process
		2.4	Identify cost factors that are a constraint to cost-efficiency in own work area
3	Apply cost-efficient work practices	3.1	Identify and explain to relevant people the implications of possible actions/changes to improve cost-efficiency in simple financial terms
		3.2	Identify non-financial implications of proposed changes in discussion with relevant people
		3.3	Select actions which minimise overall costs
		3.4	Monitor actions to ensure cost-efficiency in own work area is maintained

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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating with others to clarify cost factors and contribute suggestions for improvement
- visualising normal operational procedures in terms of flow
- distinguishing between fixed and variable costs
- identifying fixed and variable cost components relevant to own work, including where applicable:
  - power/energy
  - materials, plant and equipment
  - production or process time, including impact on salary and wages
  - office expenses
  - government taxes and charges

Required knowledge

Required knowledge includes:

- cost components of products made
- costs concepts, such as expense and income
- major cost contributors to product (e.g. energy)
- the difference between internally and externally controlled costs
- difference between overhead, labour and consumables

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the scope of their own and their teams work and relate it to the overall flow of work in the organisation • express cost factors in specific terms (e.g. cost per

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	item, process and task) and not just in a general manner • identify and express costs factors in simple financial terms • use cost factors to select lower cost alternatives when making decisions.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and

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	literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems

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	and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Cost components	Cost components include: • fixed and variable costs, such as power/energy, materials, plant and equipment, production or process time, including impact on salary and wages • office expenses, such as telephone • government taxes and charges
Process	Process may include: • a production, maintenance, logistics, office or other support process in an organisation
Overall cost	Overall cost may include: • the assessment of negative and positive financial implications • negative long-term issues, such as occupational health and safety (OHS), environmental and regulatory issues

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS402031A Interpret product costs in terms of customer requirements

Modification History

New unit, superseding MSACMT231A Interpret product costs in terms of customer requirements - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required by an individual to be able to identify the major cost components of either products or processes, the basic relationship of these to customer benefit, and use this to help minimise waste (defined as anything not delivering value as defined by the customer). It has a different focus to MSS402030A Apply cost factors to work practices, which focuses on costs in isolation, whereas this unit regards all costs not directly leading to customer benefit as waste.

Application of the Unit

This unit applies to an individual who uses their understanding of the customer's requirements of the product or process being undertaken as the basis for investigating work processes to identify waste sources and then takes action relevant to their level of competency and authority to reduce this waste. It requires an understanding of both the cost factors in the products they make and also the benefits which the customer derives from the product.

This competency may be performed individually or in a team-based environment.

This unit requires the application of skills associated with analysis and problem solving to identify waste and determine ways to minimise waste. This unit requires initiative and enterprise and application of learning in concepts of waste and waste minimisation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Identify cost components deriving from customer benefit and other costs	1.1	Identify customer features/benefits in product or process being undertaken
		1.2	Identify cost components which deliver customer features/benefits and those which do not
2	Compare required performance of product or process steps with actual performance	2.1	Identify performance required to meet customer needs in own work and that of team
		2.2	Identify actual performance
		2.3	Compare cost components of products or process with current customer-related targets
		2.4	Separate costs components into those that contribute to customer features/benefits and those that do not
		2.5	Determine non-contributing cost components which are under control of the individual or team
3	Minimise waste	3.1	Recommend changes to eliminate or reduce waste
		3.2	Adopt changes which minimises waste
		3.3	Monitor effect of changes to ensure gains are made against customer features/benefits

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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying customer benefit in own work and that of the individual's team
- identifying financial and other performance indicators for own work and of team, including where appropriate, takt time
- communicating with others to clarify cost factors and contribute suggestions for improvement
- visualising normal operational procedures in terms of flow
- distinguishing between fixed and variable costs
- classifying fixed and variable cost components in terms of relevancy to customer benefit, including where applicable:
  - power/energy
  - materials, plant and equipment
  - production or process time, including impact on salary and wages
  - required and unnecessary downtime
  - office expenses
  - government taxes and charges

Required knowledge

Required knowledge includes:

- value as defined by the customer and the relevancy to own and team's work
- ability to access company information about:
  - customer features/benefits
  - cost components of products made
  - costs concepts, such as expense and income
  - major cost contributors to product (e.g. energy)
- the difference between internally and externally controlled costs
- difference between overhead, labour and consumables

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify customer benefit from own and team's work • express cost factors (financial and other factors) in specific terms (e.g. cost per item, process and task), and not just in a general manner • identify and express costs factors in simple financial terms • contribute suggestions for improvement to minimise waste and overall costs.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge.

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	Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just In Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving

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	• run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Customer features/benefits	Customer features/benefits include: • characteristics of the product or service which add value to the customer, this value may be assessed in financial or features terms The customer may be: • internal or external
Performance	Performance may include: • the rate of output of the plant compared to the rate required to meet demand • takt, where takt time is the allowable time to produce one product at the rate and quality customers are demanding it (this is NOT the same as cycle time, which is the normal time to complete an operation on a product – which should be less than or equal to takt time)
Customer-related targets	Customer-related targets include: • internally set financial and operational targets that contribute to meeting customer features/benefits
Contributing and non-contributing cost components	Contributing costs include: • costs that make a direct contribution to customer features/benefits. These costs continue to need to be incurred (although they may be minimised) in order to gain the customer feature/benefit Non-contributing costs include: • other costs that do not contribute to customer features/benefits. These may be costs that must be maintained, such as regulatory compliance and occupational health and safety (OHS) costs and other costs which are not required and do not contribute to customer features and so should be eliminated if possible (this is also defined in terms of ***waste*** – see

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	below)
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) includes: • any activity which does not contribute to customer or organisation benefit/features in the product Categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items Waste for this unit may include activities which do not yield any benefit to the organisation or any benefit to the organisations customers

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS402040A Apply 5S procedures

Modification History

New unit, superseding MSACMT240A Apply 5S procedures in a manufacturing environment - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required by an employee to apply 5S procedures to their own job and work area. The unit assumes the employee has a particular job and an allocated work area and that processes in the work area are known by the individual.

Application of the Unit

This unit applies to an individual in an organisation who works in an operational position as part of production, maintenance, logistics, and so on. The unit can also apply to individuals in other organisations who have a discrete role and responsibility for individually managed processes. For employees in an office, the specific office-related unit *MSS402041A Apply 5S* in an office should be selected.

This unit applies where an organisation has decided to embark on a competitive systems and practices strategy and as part of this has adopted the philosophy of 5S as one of the tools to improve performance. The employee needs to apply 5S to their job and work area and maintain the housekeeping and other standards set by 5S.

This unit requires the application of skills associated with planning and organising, problem solving and self-management, in order to identify and implement 5S housekeeping practices.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Sort needed items from unneeded	1.1	Identify all items in the work area
		1.2	Sort items to achieve deliverables and value expected by downstream and final customers
		1.3	Sort items required for regulatory or other required purposes
		1.4	Place any non-essential item in a appropriate place other than the workplace
		1.5	Regularly check that only essential items are in the work area
2	Set the workplace in order	2.1	Identify the best location for each essential item
		2.2	Place each essential item in its assigned location
		2.3	After use immediately return each essential item to its assigned location
		2.4	Regularly check that each essential item is in its assigned location
3	Shine the work area	3.1	Keep the work area clean and tidy at all times
		3.2	Conduct regular housekeeping activities during shift
		3.3	Ensure the work area is neat, clean and tidy at both beginning and end of shift

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4	Standardise activities	4.1	Follow procedures
		4.2	Follow checklists for activities, where available
		4.3	Keep the work area to specified standard
5	Sustain the 5S system	5.1	Clean up after completion of job and before commencing next job or end of shift
		5.2	Identify situations where compliance to standards is unlikely and take actions specified in procedures
		5.3	Inspect work area regularly for compliance to specified standard
		5.4	Recommend improvements to lift the level of compliance in the workplace

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating with others to clarify issues during 5S implementation, communicate results and contribute suggestions for improvement
- visualising operations in terms of flow and contribution to customer outcomes
- planning own tasks in implementation of 5S
- implementing 5S in own work area according to instructions
- identifying waste (muda)
- prioritising activities and items
- reading and interpreting documents describing procedures
- recording activities and results against templates and other prescribed formats
- working with others
- solving problems

Required knowledge

Required knowledge includes:

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- operations and processes relevant to own job
- meaning and application of 5S steps to own job and work area
- principles of efficient workplace organisation
- purposes of 5S
- methods of making/recommending improvements

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify own tasks and responsibilities and relate them to organisation and customer requirements • identify and explain the stages of 5S • implement 5S in own work area • identify waste (muda) in the work area.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects

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	• suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems

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	• supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
5S	5S is a system of work organisation originally developed in Japan based around housekeeping principles. A close translation of the five stages in the housekeeping approach is: • sort • set in order • shine • standardise • sustain
Sort	Sort involves keeping only what is absolutely necessary for the processes in the work area. Sort includes: • clearing the work area of all non-essential equipment and materials Non-essential items are those not required to either produce product, conduct process or operations, or make required adjustments to equipment during process or operations
Set in order	Set in order includes: • assigning required equipment and materials appropriate locations in the work area

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Shine	Shine includes: • keeping the work area clean at all times. This should be carried out to a regular daily schedule against allowed time and, on most occasions, at the end of a job
Standardise	Standardising includes: • activities that help maintain the order and the housekeeping standards • using procedures and checklists developed from a procedure

Sustain	Sustain includes:
	• making sure that daily activities are completed every day regardless of circumstance
	• cleaning up after a job
	• undertaking inspections, including:
	  • informal inspections carried out often, at least weekly
	  • formal inspections carried out at least monthly
	• generating continuous improvement actions from daily activities
	• following up specific actions to generate continuous improvement

Items in work area	Items in work area may include: • tools • jigs/fixtures • materials/components • plant and equipment • manuals • personal items (e.g. bags, lunch boxes and posters) • safety equipment and personal protective equipment • other items which happen to be in the work area
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the operation of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing

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	practice (GMP) and responsible care) and government regulations Procedures may be: • written, verbal, computer based or in some other format

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS402050A Monitor process capability

Modification History

New unit, MSACMT250A Monitor process capability - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required for gathering of data and the interpretation of simple information to determine the compliance of the process and the taking of action as defined by the procedures where the information reveals the process is out of control parameters.

Application of the Unit

This unit applies to an individual in an organisation adopting specific competitive systems and practices, usually either six sigma or statistical process control/three sigma, as a means of determining and improving the capability of their process to customer requirements. The individual is involved in collecting specified data and performing specified manipulations to the data (typically by plotting on a chart or by entering into a nominated computer program). The information is typically presented to team members in terms of graphs/charts which they are expected to interpret at a basic level and then take action in accordance with procedures to restore the process to being under control parameters.

This unit requires the application of skills associated with entering and monitoring operational data and information and requires initiative, enterprise and problem solving in identifying production variations and making improvement recommendations.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

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1	Collect and process data	1.1	Take specified measurements/readings, as required
		1.2	Enter data in log, computer or other record
		1.3	Manipulate and/or chart data as required by procedures
2	Identify variations that are not random and take action	2.1	Examine chart and/or reliability information
		2.2	Distinguish between random variations and those with an identifiable cause
		2.3	Take action specified in procedures when a variation with an identifiable cause occurs
3	Assist in process improvement	3.1	Collect data for process capability improvement trials
		3.2	Make recommendations for improvement
		3.3	Implement revised capability monitoring procedures

Elements and Performance Criteria

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- reading and interpreting electronic and hard copy operating instructions and documents, including where used:
  - work instructions

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  - standard operating procedures
  - formulas/recipes
  - production and batch sheets
  - temporary instructions
  - other provided operating instructions
- monitoring performance data against specifications and control parameters
- examining equipment procedures, products and processes for possible causes of variations
- identifying when corrective action is required by reference to procedures

Required knowledge

Required knowledge includes:

- data collection methods for operations in work area
- data processing techniques required
- basic variability and normal distribution
- recognition of identifiable causes in accordance with procedures
- causes of different types of identifiable causes as defined by procedures
- actions to be taken for the different causes

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence should be available of data collected and processed. There may also be evidence of assignable causes recognised and action taken. There should not be evidence of assignable causes being ignored. A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the scope of operations, including required performance parameters in their work area • collect, enter and process data, including normal performance and variations • read and interpret data, including identifying variation to set parameters • determine where assignable causes can be allocated to variations and take appropriate action • participate in data collection, when required, for

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	process capability trials • contribute suggestions for improvement.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems. • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector

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Six sigma	Six sigma is a process improvement methodology based on statistical process control with six sigma limits which equates to 3.4 defects per million opportunities for each product or service transaction Six sigma is also often used as a general term covering a competitive systems and practices approach. Six sigma training typically covers several units of competency in this Training Package
Three sigma	Three sigma includes: • statistical process control with three sigma limits which equates to 3 defects per thousand opportunities for each product or service transaction
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations Procedures may be: • written, verbal, computer-based or in some other form
Random variation	Random variation is the term used in statistical control to refer to those variations for which no cause can be found
Identifiable cause	Identifiable cause (also referred to as assignable cause or special cause) refers to: • those variations for which a cause can be found and so the cause of the variation eliminated
Process capability	Process capability means the capability of the process to deliver to customer defined requirements. Process capability includes process stability against standardised practices and documentation to eliminate variation against customer requirements

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Unit Sector(s)

Unit sector	Competitive systems and practices

Custom Content Section

Not applicable.

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MSS402051A Apply quality standards

Modification History

New unit, superseding MSACMT251A Apply quality standards - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to apply quality standards to work operations in an organisation. The unit is designed to complement competitive systems and practices units.

Application of the Unit

This unit applies to an individual who is expected to take responsibility for the quality of their own work, and to take actions specified in the procedures and within the scope of their job and authority to ensure that quality standards are met.

This unit requires the application of skills associated with interpreting and applying workplace standards and identifying and addressing problems that interfere with quality outcomes. The unit requires initiative, enterprise and self-management to ensure quality standards are achieved.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

1	Assess own work	1.1	Continuously check completed work against workplace standards relevant to the operation being undertaken
		1.2	Demonstrate an understanding of how the work activities and completed work relate to the next production process or processes and to the final products or services concerned
		1.3	Identify and isolate faulty components, products or processes
		1.4	Record and/or report faults and any identified causes to the supervisor concerned, where required, in accordance with workplace procedures
2	Assess quality of received components, parts or materials	2.1	Continuously check received components, parts, materials, information, service or final products against workplace standards and specifications for conformance
		2.2	Demonstrate an understanding of how the received components, parts or materials, information or service relate to the current operation and how they contribute to the final quality of the product or service
		2.3	Identify and isolate faulty components, parts, materials or information that relate to the operator's work
		2.4	Record and/or report faults and any identified causes in accordance with workplace procedures
		2.5	Identify causes of any identified faults and take corrective action as specified in workplace procedures
3	Measure components, parts or materials	3.1	Measure materials, component parts, information, service or products, as required, using the appropriate measuring instruments in accordance with workplace procedures

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4	Record information on production indicator	4.1	Record basic information on quality and other indicators of process performance in accordance with workplace procedures
5	Investigate causes of quality deviations	5.1	Investigate and report causes of deviations from specified quality standards for components
		5.2	Recommend suitable preventative action based on workplace quality standards and the identified causes of deviations from specified quality standards of materials

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- interpreting work instructions, specifications, standards and patterns appropriate to own work
- carrying out relevant visual inspections of materials, component parts and final products
- carrying out relevant physical/chemical measurements or tests
- maintaining accurate work records in accordance with procedures
- carrying out work in accordance with occupational health and safety (OHS) policies and procedures
- meeting work specifications
- communicating effectively within defined workplace procedures
- interpreting and applying defined procedures

Required knowledge

Required knowledge includes:

- relevant quality standards, policies and procedures
- relevant production processes, materials and products
- basic characteristics of materials used in the relevant production processes
- safety and environmental aspects of relevant production processes
- relevant measurement techniques and quality checking procedures
- workplace procedures
- reporting procedures

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • interpret, relevant work instructions, standards and specifications appropriate to own work • check and measure relevant quality parameters • interpret results of quality checks in terms of specifications, patterns and work standards • take required action where standards of materials, component parts, final product or work processes are found to be unacceptable • maintain accurate records.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of

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	contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis

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	• 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Quality parameters	Quality parameters may include: • finish • size • durability • product or process variations • materials • alignment • colour • damage and imperfections • time
Quality checks	Quality checks are against set parameters for the process or product. Examples include: • visual inspection • physical measurements • chemical tests • checks against patterns, templates and guides • processing time
Materials	Materials may include: • physical raw materials • orders, forms and other documentation • services required for undertaking an operation (e.g. power, water, compressed air and fuel)

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Measure	Measure includes: • those measurements which may be taken by the employee in the workplace/at their work station
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the operation of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations Procedures may be: • written, verbal, computer-based or in some other format
Indicators of production performance	Indicators of production performance may include: • number of items/production rate • delays and causes of delays (where known) • other information as specified in the procedures
Data entry/recording	Data entry/recording may include: • keyboard • written (including ticks or signs) • verbal
Sources of information/ documents	Sources of information/documents may include: • quality and Australian standards and procedures • work instructions, patterns, designs and recipes • organisation work procedures • manufacturer instructions for materials and equipment • organisational or external personnel • customer requirements
Investigate and report	Investigate and report includes: • following set procedures defined for such investigations Set procedures may include: • verbal instructions

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	• documented procedures • other quality procedures as implemented within an organisation or work environment

Workplace context	Workplace context includes:
	• work organisation procedures and practices relating to the manufacture and quality outcomes for products
	• conditions of service, legislation and industrial agreements, including:
	  • workplace agreements and awards
	  • federal or state/territory legislation
	  • standard work practice

Reporting/communication	Reporting/communication may include: • verbal and written communication in accordance with organisational policies and procedures • oral, written or visual communication and may include simple data
Being responsible for the maintenance of own work quality	Being responsible for the maintenance of own work quality may include: • contributing to the quality improvement of team or section output, where necessary, in accordance with workplace procedures • following safety, environmental, housekeeping and quality procedures as specified by materials/machine/equipment manufacturers, regulatory authorities and the organisation
Applicable regulations and legislation	Applicable regulations and legislation may include: • OHS legislation relevant to workplace activities • workers compensation legislation

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS402060A Use planning software systems in operations

Modification History

New unit, superseding MSACMT260A Use planning software systems in manufacturing - Not equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to access planning software (often known as Enterprise resource Planning (ERP), Materials Resource Planning (MRP and MRPII), and often by a proprietary name, to make routine business decisions required of the person as a regular part of their job.

Application of the Unit

This unit applies to an individual in an organisation using a planning software system and who must interface with that system. The unit applies to both accessing information from the planning software system and using it as an aid to decision making. This unit requires the application of communication, planning, and problem solving associated with using planning software in own work.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

1	Use interface	1.1	Identify terminals relevant to own work station and functions
		1.2	Use keyboards, track ball/mouse and monitor and/or other peripherals to access system
		1.3	Navigate through system and screens to find program menu and data relevant to own work
		1.4	Identify and input information on own work processes at required frequency and to required detail
		1.5	Access message section and acknowledge messages
		1.6	Identify problems and make suggestions for improvements to relevance of planning software to own work
2	Access information	2.1	Identify work processes that require information from planning software system
		2.2	Obtain relevant data and information on current operations from the planning software system
		2.3	Identify the status of items in the value stream
		2.4	Access historical data and information
		2.5	Interpret information and identify and prioritise any actions required in response to information
3	Take appropriate actions in accordance with procedures	3.1	Take actions in response to information obtained from planning software
		3.2	Follow up as appropriate to ensure anticipated results have occurred
		3.3	Record adjustments and variations according to procedures

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3.4 Identify any learning needs to use planning software and seek appropriate support

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- reading and interpreting electronic and hard copy operating instructions and documents, including where used:
  - work instructions
  - standard operating procedures
  - formulas/recipes
  - production and batch sheets
  - temporary instructions
  - other provided operating instructions
- working within access control requirements of the planning software system
- identifying modules, screens, files, and so on, of software relevant to own work
- logging in and using terminals and planning software at a level of access appropriate to own work
- accurately inputting data
- searching and retrieving data
- accessing nominated assistance with planning software

Required knowledge

Required knowledge includes:

- technical knowledge needed to operate own work processes
- planning software system and operation, including:
  - terminal locations and types
  - security and access arrangements
  - range of information held in planning software relevant to own work
  - data collection methods for operations in work area
  - assistance arrangements for users of planning software
  - business activities exercised by/through the planning software system
- value created by operations for customers

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the scope and relevance of planning software system to their own work • enter and retrieve data, including normal performance and variations • use planning software system to assist in own work • contribute suggestions for improvement to performance and relevance of planning software to own work area.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues

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	(third-party reports) • portfolio of evidence In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz)

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	• cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Planning software	Planning software includes: • software systems which integrate a range of business information, such as finance, logistics maintenance and production (frequently referred to as ERP, MRP, MRPII or a range of proprietary names)
Relevant data and information	Relevant data and information may include: • technical and other drawings • standard operating procedures and other work instructions • production schedules including historical data • orders and order tracking information • stock control • contact lists • occupational health and safety (OHS) information
Value stream	The value stream begins with the customer and includes all actions (both value-adding and non-value added) by both internal sections/departments and external organisations to meet a customer requirement. Depending on the operations and the customer requirement, stages where value stream actions may occur include: • sales outlet/representative • information gathering, data analysis and research • product design • raw material sourcing • intermediate processing

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	• final assembler/collation/preparation • support services (e.g. accounting, finance and legal) • storage and delivery to customer • after market support
Items in the value stream	Items in the value stream refer to information held within the planning software system that contributes to creating value as determined by the customer. Depending on the organisation it may include: • physical elements of the production system, such as sites, work stations, equipment, material, including stock, work in progress and finished products • information needed to meet customer requirements, such as designs, drawings, work instructions, standard operating procedures, standards, material lists and pricing • information not directly related to current customer requirements but required by the organisation
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations Procedures may be: • written, verbal, computer-based or in some other format

Unit Sector(s)

Unit sector Competitive systems and practices

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Custom Content Section

Not applicable.

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MSS402061A Use SCADA systems in operations

Modification History

New unit, superseding MSACMT261A Use SCADA systems in manufacturing - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required by an individual to interact with a System Control and Data Acquisition (SCADA) system as part of their job.

Application of the Unit

This unit applies to an individual in an organisation using a SCADA system and the individual must interface with that system. The individual will need to access this system as part of their routine and take actions based on the information they obtain from the SCADA system in accordance with procedures.

This unit requires the application of skills associated with using communication tools and technology for management of own work, planning and problem solving.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

1	Use operator interface	1.1	Identify SCADA terminals relevant to own work station and functions
		1.2	Use keyboards, track ball, monitor and/or stand alone controllers to access/interrogate system
		1.3	Use correct level of access and find all relevant screens and information
		1.4	Access message section and acknowledge messages
		1.5	Input and output information correctly according to program and organisation requirements
2	Use information	2.1	Obtain data and information from SCADA, as required, including process, supply and product chain data
		2.2	Interpret data and information as required by own job
		2.3	Find and use relevant historical data and information
		2.4	Use manufacturer manuals or specifications, as required, to expand knowledge of SCADA system relevant to own work
		2.5	Determine and prioritise required actions
3	Make required changes in accordance with procedures	3.1	Adjust production/process in response to SCADA information
		3.2	Record adjustments and variations to specifications/schedules and report to appropriate personnel
		3.3	Seek feedback and information on adjustments to further improve procedures, where required

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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- using SCADA terminals and other input devices
- reading and interpreting electronic and hard copy SCADA operating instructions and documents, including where used:
  - work instructions
  - standard operating procedures
  - temporary instructions
  - other provided operating instructions
- working within security and access control requirements of the SCADA system
- identifying modules, screens, and so on, of SCADA system relevant to own work
- accurately inputting and outputting data
- searching and retrieving data
- accessing SCADA system nominated assistance, when required

Required knowledge

Required knowledge includes:

- technical knowledge needed to operate own work processes
- hierarchy of SCADA system and operation
- information available from and controls exercised by/through the SCADA system

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the scope and relevance of the SCADA system to their own work • access correct levels of the SCADA system • enter and retrieve data, including normal performance and variations

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	• use SCADA system to assist in own work.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented ,or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as SCADA software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
SCADA	SCADA refers to: • a number of systems which automatically collect

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	critical process data, perform required mathematical manipulations on it and then make control decisions and/or give required information to personnel for action In some industry sectors, the SCADA system is sometimes integrated into other sophisticated computer control systems, such as Distributed Control System (DCS). These sectors may simply refer to their SCADA as the DCS or other similar term (such as the proprietary name of the computer system). SCADA systems may provide information from outside of the process, such as stock/material levels in a customer plant and/or available supply, supply rates and pricing from a supplier plant. This information may all be accessed by the SCADA system and the employee using it in order to make production rate and other control decisions (either automatically or human assisted) about their own operations and work processes
Supply and product chains	The supply chain Includes: • all suppliers in the chain from the initial raw material up to the current step in the operations process The product chain includes: • all steps after the current step up to the final customer Competitive systems and practices organisations encompass the entire production system, beginning with the customer, and includes: • the product sale • outlet • the final assembler • product design • raw material mining and processing • all tiers of the value stream (sometimes called the supply chain) Any truly 'competitive' system is highly dependent on the demands of its customers and the reliability of its suppliers. No implementation of competitive systems and practices can reach its full potential without including the entire 'organisation' in its planning
Procedures	Procedures may include: • work instructions • standard operating procedures

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	• formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations Procedures may be: • written, verbal, computer-based or in some other format

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS402080A Undertake root cause analysis

Modification History

New unit, superseding MSACMT280A Undertake root cause analysis - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to undertake root cause analysis (RCA) by any person. This will often be undertaken by people working in a team. This unit also covers the competencies needed by operators to contribute to an advanced maintenance strategy using RCA coupled with diagrams and charts.

Application of the Unit

This unit applies to individuals working in an organisation which is applying competitive systems and practices strategies. The unit applies to the formal problem solving to root cause that the individual must undertake in their own work area or where the individual contributes to problem solving to root cause as part of a team.

This unit requires an ability to seek and apply information from a variety of sources in order to inform RCAs. Initiative and enterprise is also required to identify quick fix and permanent solutions to problems.

Where training in a wider range of problem solving techniques and tools is required the unit MSAPMSUP390A Use structured problem solving tools should be selected.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the Performance criteria describe the performance needed to

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essential outcomes of a unit of competency.	demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Recognise problems	1.1	Identify features or occurrences indicative of a problem
		1.2	Use appropriate tools, techniques and charts to define the problem
2	Implement quick fix	2.1	Recommend a quick fix within the scope of competency and authority
		2.2	Use technology or processes relevant to the problem to implement quick fix
3	Determine root cause	3.1	Identify a range of possible causes
		3.2	Gather data and other information to eliminate or confirm possible causes
		3.3	Use available data and information to link causes and effects
		3.4	Seek assistance, as required
		3.5	Identify root cause
4	Develop permanent solution	4.1	Identify a range of methods to eliminate the root cause or break the cause tree
		4.2	Select the most appropriate solution
		4.3	Liaise with relevant people
		4.4	Recommend or implement solution within the limits of competency and authority

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4.5 Monitor impact of solution and make further recommendations, as required

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- cooperating and working with others on problem solving
- assessing and recording information from a variety of sources
- defining potential problems factually, including:
  - location and extent of problem or incident
  - sequence of events where relevant
  - extent of deviation from normal operation or performance
- analysing potential problems across a range of varied activities and knowledge applications
- reading and constructing simple charts, such as cause and effect diagrams

Required knowledge

Required knowledge includes:

- RCA methodology, including difference between quick fixes and root cause elimination or breaking of causal tree
- principles and normal operation of equipment, plant and processes in own work area sufficient to undertake a RCA and propose solutions
- common variances to normal performance that are indicators of a problem
- use of relevant analysis tools (e.g. cause/effect diagrams, Pareto charts and 5 Whys)
- operations in own work area

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and	A person who demonstrates competency in this unit must

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evidence required to demonstrate competency in this unit	be able to provide evidence of the ability to: • undertake problem identification • use appropriate processes to achieve root cause identification • prioritise solutions • recommend solutions and implementation procedures to problems within own area and range of technical skills and knowledge • evaluate implementation of solutions.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess response to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and

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	disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree

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	Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Features or occurrences indicative of a problem	Examples of features or occurrences indicating problems include: • variation to normal plant or equipment operation • unplanned or non-conforming process or operations outcomes • out of specification products • excess scrap • accidents and emergencies • regulatory breaches • customer returns and complaints • reduction or loss of sales
Root cause	There are many possible causes of any problem. The root cause contrasts with other possible causes of a problem which when eliminated have no impact or only ameliorate the problem. Elimination of the root cause permanently eliminates the problem. There should only be one root cause for any problem and so the analysis should continue until this one cause is found.
Cause tree	The series of causes is referred to as the cause tree. Not all root causes are accessible and able to be eliminated. Breaking the cause tree is such a way that the problem cannot recur is an acceptable alternative. Not all situations can wait for the RCA and eventual elimination of the root cause as there may be serious current impacts. The quick fix will control these immediate impacts, but does not eliminate the root cause.
Quick fix	A quick fix is not a short cut or side step for a permanent solution to the root cause. It is a necessary step designed to control the immediate impacts of a problem, for example, to prevent ongoing errors or to ameliorate damage.
Appropriate techniques/charts	Appropriate techniques/charts may include: • control charts • Pareto charts

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	• run charts • flow charts • cause and effect diagrams • tree diagrams • 5 Whys analysis

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS402081A Contribute to the application of a proactive maintenance strategy

Modification History

New unit, superseding MSACMT281A Contribute to the application of a proactive maintenance strategy - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to make a positive contribution to proactive maintenance strategies, including actions that contribute to equipment uptime and overall equipment effectiveness (OEE).

Application of the Unit

This unit applies to an individual in an organisation which is following a predictive, preventative or reliability-centred maintenance strategy and which requires commitment from all employees. The employee should 'own' their equipment/plant and take an active part in the implementation of the strategy within the scope of their authority.

This unit requires the application of skills associated with accessing and maintaining equipment/plant documentation, It also requires problem solving, initiative and enterprise to continually monitor and maintain operational performance of equipment/plant used in work role.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised

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unit of competency.	text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Maintain equipment/plant	1.1	Keep equipment/plant within area of responsibility clean
		1.2	Ensure equipment/plant is serviced and adjusted, as required, in accordance with procedures and own level of responsibility
		1.3	Access manufacturer manuals and specifications, where required, to expand knowledge on the maintenance of equipment/plant
		1.4	Access and update documentation on equipment/plant operation and maintenance as appropriate to workplace procedures
2	Monitor operation of equipment/plant	2.1	Regularly check key conditions of the equipment/plant as defined in workplace procedures
		2.2	Regularly check equipment/plant OEE
		2.3	Note any deviation from conditions specified in procedures
		2.4	Identify any previous occurrences of this deviation
3	Identify deviations and patterns	3.1	Identify any previous occurrences of a deviation
		3.2	Identify any related deviations which have occurred
		3.3	Identify any unusual occurrence which may be related to a deviation
4	Take action appropriate to	4.1	Liaise with relevant people regarding the deviation and the solution

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competency and authority on deviation	4.2	Implement solution and/or assist with the implementation of the solution, as appropriate

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- reading and interpreting electronic and hard copy plant, equipment, and process instructions and documents, including where used:
  - work instructions
  - standard operating procedures
  - workshop manuals and instructions from equipment manufacturers in regards to plant or equipment operation, regular maintenance, troubleshooting, and record of use or production
  - production and batch sheets
  - temporary instructions
  - other provided operating instructions
- examining equipment procedures, products and processes for possible causes of deviations from patterns of normal use
- interpreting OEE rates
- servicing and maintaining plant and equipment consistent with area of responsibility and own technical skills

Required knowledge

Required knowledge includes:

- normal behaviour of the equipment/plant
- indicators of abnormal performance
- principles of operation of plant and equipment sufficient to recognise problems and propose solutions
- appropriate cleaning and adjusting for the equipment/plant/area as required by procedures
- concept of OEE as: *availability x performance x quality rate*

where:

- availability takes into account losses due to breakdown, set up and adjustments
- performance takes into account losses due to minor stoppages, reduced speed and idling

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- quality rate takes into account t losses due to rejects, re-works and start-up waste

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • recognise deviations from normal performance patterns and deal with them appropriately • undertake operational service and maintenance on plant and equipment according to instructions.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports)

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	• portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams

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	• OEE • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Uptime	Uptime refers to: • the overall availability of the plant – it is the inverse of downtime or the unavailability of the plant. Ideal uptime is 100%
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations Procedures may be: • written, verbal, computer-based or in some other format

Unit Sector(s)

Unit sector Competitive systems and practices

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Custom Content Section

Not applicable.

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MSS403001A Implement competitive systems and practices

Modification History

New unit, superseding MSACMS400A Implement a competitive manufacturing system - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to implement and review competitive systems and practices in a person's own work within a team or work area, including the consideration of the impact on the work of others. The unit focuses on the holistic application of competitive systems and practices to achieve improved performance in own work and in activities with others in the team or work area that contribute to improving customer benefit.

Application of the Unit

This unit applies to individuals who are applying competitive systems and practices to their own work in a way that integrates with others in the team or work area who are also implementing competitive systems and practices. Depending on the operations or processes in the team or work area the unit may also include interaction with other teams and work areas.

The unit is suitable for individuals who have formal responsibility for the work of others, such as team leaders. It is also suitable for individuals, such as technicians and tradespeople, who must integrate the application of their technical skills with the implementation of competitive systems and practices in an organisation.

The unit applies to the areas of cost, quality, delivery, safety/environment, and employee capability including continuous reviewing of performance against these five areas in liaison with other relevant people. Improvement initiatives in these five areas are usually developed and implemented with the support of technical support staff. Whereas other units may emphasise the competence to use one or more competitive practices, this unit emphasises the ability to advance on all five key areas over a moderate time period.

This unit requires the application of skills associated with problem solving and initiative and enterprise in order to identify opportunities to make improvements and maximise performance. Communication, the ability to work in a team and planning and organising skills are required to implement improvements and address any conflicts that arise. This unit also requires an ability to identify appropriate technology, and to consider and integrate feedback on how personal performance can be improved.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Contribute to the improvement of the operations system in team or work area	1.1	Identify key performance indicators for area of operations
		1.2	Implement and review competitive systems and practices to improve health, safety and environment (HSE) performance of self and others
		1.3	Implement and review competitive systems and practices to maximise quality consistency
		1.4	Implement and review competitive systems and practices and identify any skill and training issues that need to be addressed to improve capability of self and others
		1.5	Implement and review competitive systems and practices to maximise customer benefit/cost ratio
		1.6	Implement and review competitive systems and practices to reduce lead time to delivery within the scope of authority and responsibility
		1.7	Work with relevant stakeholders to resolve conflicts

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			which arise from implementation of competitive systems and practices
		1.8	Select improvements which will deliver the greatest overall benefit for the resources required/available without reducing current performance on individual factors
2	Implement improvements	2.1	Implement the chosen improvement/s
		2.2	Check the selected improvements improve the system as a whole and do not result in unintended consequences
		2.3	Monitor implementation and make adjustments, as required

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating with others to clarify scope of implementation of competitive systems and practices, including:
  - value stream mapping
  - 5S
  - Just in Time (JIT)
  - mistake proofing
  - process mapping
  - establishing customer pull
  - kaizen and kaizen blitz
  - setting of key performance indicators/metrics
  - identification and elimination of waste (muda)
- monitoring performance in key areas, including:
  - HSE performance
  - quality consistency
  - capability and performance by team members
  - customer benefit/cost ratio
  - reduce lead time to delivery

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- contributing suggestions for improvement
- analysing operational procedures in terms of flow and contribution to customer outcomes
- planning tasks to support competitive systems and practices implementation
- identifying and implementing appropriate data gathering and analysis techniques within area of responsibility to identify change over time in indicators relating to:
  - cost
  - quality
  - delivery
  - safety/environment
  - employee capability and support for competitive systems and practices
- solving problems to root causes

Required knowledge

Required knowledge includes:

- customers and the value they derive from products and processes of the organisation or area
- cost components and their relationship to customer benefits/features
- suppliers and their capabilities
- waste (muda)
- factors causing variability in a product and how to control them
- factors that promote standardisation
- relevant competitive systems and practices tools for area and how to apply them
- factors impacting on the product, process and waste, particularly those wholly or partially under own and other immediate area employees control (and how to control them)
- good HSE practice and factors impacting on HSE performance
- own capability and how to improve it
- optimisation techniques appropriate to the organisation and the job
- application of quality standards and processes

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • identify key performance indicators appropriate to their own work area

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	• implement and review competitive systems and practices in own work, including interaction with others in the work area in the areas of:
	  • HSE performance
	  • quality consistency
	  • capability and performance by team members
	  • customer benefit/cost ratio
	  • reduce lead time to delivery
	• select improvements that deliver the greatest overall benefit
	• monitor the implementation of improvements and make appropriate adjustments.

Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning for appropriate portions • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence In all cases it is expected that practical assessment will be combined with targeted questioning to assess

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	underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping

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	• problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Competitive systems and practices tools	Competitive systems and practices tools include: • 5S • 6 sigma • continuous improvement • cause effect diagrams
Customer	Competitive systems and practices organisations encompass the entire production system, beginning with the customer, and includes: • the product sales outlet • the final assembler • product design • raw material mining and processing • all tiers of the value stream (sometimes called the supply chain) Customer may include: • internal or external customers, and should also include the final customer as the basis for the identification of waste The unit does not require interfacing directly with the external customer, but there should be sufficient information to identify customer benefits and features
Supplier	Supplier may include: • an internal supplier • an external supplier The unit does not require interfacing directly with external suppliers, but there should be sufficient information to enable identification of supplier abilities
Waste	Waste (also known as muda in the Toyota Production

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	System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items • other activities which do not yield any benefit to the organisation or any benefit to the organisations customers
Operations	Operations indicate: • the holistic combination of the process, plant and equipment, procedures and practices, including the skills and work organisation of the workforce, which make up the productive organisation
Implement improvements	Implementation of improvements may be undertaken: • within own job role • as part of processes and operations in the work area or team

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS403002A Ensure process improvements are sustained

Modification History

New unit, superseding MSACMS401A Ensure process improvements are sustained - Not equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to ensure that the gains which have been made by using improved methods, processes and equipment are sustained as the new baseline/standard for an area of work and so prevent regression to former practices, or digression to less efficient practices.

Application of the Unit

This unit applies to individuals working in a team or work area who have already implemented competitive systems and practices related improvements in their own work and who must work effectively with others implementing competitive systems and practices to ensure that performance improvement gains are sustained.

The unit is also suitable for individuals who have formal or informal responsibility for the work of others, such as team leaders; individuals, such as senior operators, who must mentor others; or individuals, such as technicians and tradespeople, who must integrate the application of their technical skills with the implementation of competitive systems and practices in an organisation.

The unit can be applied to all areas of an organisation, including production, maintenance, logistics and office functions.

The unit covers the implementation of practices to ensure that process improvements are sustained and opportunities taken to suggest further improvements. If mistake proofing is used as one of the methods for ensuring that process improvements are sustained, the unit MSS403051A Mistake proof a production process should be selected.

Improvement initiatives can be made by any of any number of methods and by teams or individuals. The unit assumes that desired levels of performance or quality are known.

This unit requires the application of skills associated with problem solving, initiative and enterprise, and planning and organising in order to check and monitor the impacts of change. It also requires communication and the ability to work with others to assess the impact of change in own work and on other’s work, as well as self-management and learning to adapt improvements according to new information and feedback.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Examine previous improvements	1.1	Identify impact of previous process improvements to systems, equipment, operations or products in work area
		1.2	Identify improvements that have not met objectives
2	Ensure corrective actions are implemented	2.1	Identify corrective actions that can be taken on process improvements that have not met objectives
		2.2	Liaise with relevant people associated with the anticipated corrective action
		2.3	Obtain any required approvals
		2.4	Ensure the supply of resources
		2.5	Check impacts of corrective action on occupational health and safety (OHS), quality and environmental systems in work area and take action in accordance with procedures, if required

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		2.6	Check that self and others in team or work area have required skills for corrective actions
		2.7	Monitor implementation of corrective action
		2.8	Make required adjustments
3	Verify systems support improvement	3.1	Ensure procedures reflect improvements
		3.2	Check that training and assessment activities in team or work area reflect improvements
		3.3	Liaise with relevant people to ensure their support of the new or modified system/s
4	Audit the change	4.1	Determine an appropriate audit period/cycle
		4.2	Agree relevant measures/indicators for the improvement
		4.3	Measure performance at agreed times using agreed measures
		4.4	Investigate causes of under-performance
		4.5	Take appropriate corrective action to improve performance
		4.6	Re-audit the improvement on an agreed basis

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating with others to clarify scope and stage of implementation of competitive systems and practices and contribute suggestions for further improvements in implementation
- examining normal operational procedures in terms of flow and contribution to customer benefit
- planning own tasks, including the impact on others to support competitive systems and

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practices implementation
- implementing competitive systems and practices in own work area according to instructions
- identifying waste (muda)
- monitoring competitive systems and practices performance indicators for own work and work area

Required knowledge

Required knowledge includes:

- overall procedures for and process of operations relative to improvements being made
- appropriate measures of performance
- business performance goals sufficient to determine best measures of improved performance

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify process and operational changes as a result of implementation of competitive systems and practices • identify and assess impact of performance improvements in a work area against objectives • identify actions and resources required for further improvements • communicate and negotiate with others on improvements • apply procedures for seeking approvals and reporting non-conformances • determine appropriate period and procedures for monitoring implemented changes.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned,

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	currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using some combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of

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the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Improvement	Improvement may be any change aimed at reducing waste (muda). This unit is not about making the improvements, but ensuring beneficial changes remain in place
Customers	Customers may include: • internal or external customers, including final

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	customers, as these should be used as the basis for the identification of value and waste The individual does not need to interface directly with the external customer, but should be able to sufficiently identify customer benefit and customer features in processes and operations of their team and their work area
Suppliers	Suppliers may be: • internal or external suppliers and should be sufficiently close to the individual's work as to be easily identifiable The operator does not need to interface directly with external suppliers, but should be provided with sufficient information to enable them to identify supplier contribution to their own work and to customer benefit
Systems	Systems are used to mean any/all of the equipment, processes, procedures and work practices that are used to produce the product. A term often used in this context includes: • kaizen - the philosophy of continual improvement that every process can and should be continually evaluated and improved in terms of time required, resources used, resultant quality and other aspects relevant to the process
Resources	Resources for corrective actions may include: • equipment • modifications • consumables • people • suitable work area
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the organisation • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) and government regulations

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	Procedures may be: • written, verbal, computer-based or in some other format
Improvements	Improvements include: • techniques for preventing mistakes by designing the operations process, equipment and tools so that an operation literally cannot be performed incorrectly (e.g. baka-yoke) • techniques that generate warning signals were a mistake is about to be performed (poka-yoke) Improvements may be sustained by: • use of technology so that it is impossible to do the job any other way • changes to process or procedures or other changes to the operations system which, if followed, will sustain the change and this unit may be applied to all these situations
Measuring performance	Measuring improvements may include: • personally taking measurements • arranging for measurements to be taken/made by appropriate personnel

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS403010A Facilitate change in an organisation implementing competitive systems and practices

Modification History

New unit superseding MSACMC410A Lead change in a manufacturing environment - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required by individuals responsible for facilitating change processes in an organisation implementing competitive operational practices.

Application of the Unit

This unit applies to people who facilitate the change process resulting from implementing one or more competitive systems or practices. This implementation may also be associated with other changes, such as the introduction of new products, processes or equipment. The unit will usually apply to people whose responsibility is at the team, area or section level rather than the whole organisation. The responsibility may be formally designated or be informal, as in mentoring and assisting fellow employees.

This unit assumes that consultation and agreement on the implementation of the competitive systems and practices and other associated changes has already occurred and the nature and extent of the change has been agreed.

This unit does not cover the negotiation of change in a formal industrial relations sense but does cover the skills needed to identify real or potential change implementation issues, including those that may need to be referred to formal consultation and/or dispute settlement procedures.

This unit has a strong emphasis on planning, encouraging and facilitating in a changing environment within the organisation, including using appropriate communication, teamwork, problem solving, initiative and self-management.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Define nature and impact of change for designated area and processes	1.1	Identify the organisation's aims and objectives for the competitive systems and practices techniques related to the change process
		1.2	Identify opportunities for implementation of change within work area
		1.3	Determine impacts of change for work area, including potential benefits and impacts on own work and work of fellow employees
2	Identify key performance indicators (KPIs)	2.1	Liaise, where required, with managers, engineers and other staff responsible for designing and/or implementing change
		2.2	Identify KPIs for own work responsibility and that of the work area
		2.3	Communicate KPIs to fellow employees
		2.4	Check that data collection and processing are appropriate for KPIs
		2.5	Raise and resolve issues related to KPIs with relevant personnel

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3	Liaise with key stakeholders	3.1	Identify key stakeholders impacted by the change
		3.2	Communicate with key stakeholders within scope of authority
		3.3	Identify and address issues and concerns of each stakeholder if within scope of authority
		3.4	Develop and/or locate information required to address key concerns
		3.5	Refer issues and concerns outside of scope of authority to appropriate personnel
4	Develop a strategy to help implement change	4.1	Identify or develop a work plan for implementing change
		4.2	Make information required to support change available to team members
		4.3	Communicate/circulate draft work plan to other employees in work area, supervisors, technical experts and other appropriate personnel for comment
		4.4	Assess suggested changes and incorporate into work plan, where appropriate
5	Implement change	5.1	Obtain authorisation to commence change implementation in accordance with organisation procedures
		5.2	Implement change in accordance with work plan and organisational occupational health and safety (OHS) and consultation procedures
6	Monitor implementation of change	6.1	Maintain open communication channels with all stakeholders during implementation
		6.2	Monitor KPIs during implementation
		6.3	Encourage and facilitate improvement suggestions of team members
		6.4	Identify areas requiring improvement in change

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implementation

6.5 Make improvements to implementation according to organisation procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying the competitive operational practices being implemented in the organisation, including:
  - Just in Time (JIT) and kanban systems
  - preventative maintenance
  - 5S housekeeping
  - continuous improvement processes (e.g. kaizen)
  - waste (muda) elimination
  - formal problem solving procedures (e.g. root cause analysis (RCA))
- identifying other products, processes or equipment changes being implemented within area of responsibility
- identifying the work and culture changes required for effective implementation of the competitive systems and practices being implemented and other products, processes or equipment changes
- identifying organisation KPIs and contextualise for area of responsibility to determine successful change implementation
- planning strategies for change implementation, including:
  - required communication with others
  - negotiations if any required with internal and external suppliers, customers and delegates
  - analysis of any skill gaps in self and others
  - required training
  - data collection
  - work organisation and procedure changes
  - risk identification and contingency measures
- monitoring performance against KPIs and taking appropriate corrective action in the event of a non-conformance
- identifying and communicating with sources of assistance if difficulty is experienced with changes

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Required knowledge

Required knowledge includes:

- features of common competitive operational practices, including:
  - JIT and kanban systems
  - preventative maintenance
  - 5S housekeeping
  - continuous improvement processes (e.g. kaizen)
  - waste (muda) elimination
  - formal problem solving procedures (e.g. RCA)
- health, safety and environment (HSE) principles and requirements for area of responsibility
- change implementation contacts and procedures relevant to work area
- employee assistance mechanisms in the organisation
- processes to develop work plans, including consideration of timetable, KPIs, training needs, OHS implications, contingency plans and responsibilities (the work plan must be capable of being coherently communicated to others)

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the competitive systems and practices used in their own work • identify changes to their own work flowing from the implementation of the relevant competitive systems and practices • implement changes • know when and how to seek assistance with work changes • make suggestions for improvements.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned,

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	currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using some combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of

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the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Team	Team may include: • work teams from all sections of an organisation, including production or other operational areas, maintenance, technical, administration/finance, and sales/marketing
Change	The philosophy of continual improvement is that every

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	process can and should be continually evaluated and improved in terms of time required, resources used, resultant quality, and other aspects relevant to the process. Superimposed on this is the concept of breakthrough change when a large change/improvement is made which can shift the direction or operation of the organisation. Once such breakthrough change is the introduction of competitive operational practices.
Work plan for change	The work plan for change covers the designated work area and may include, depending on the organisation and work area processes: • timetable • KPIs • training needs • OHS implications • contingency plans • responsibilities with team members and senior managers, engineers and other staff responsible for designing and/or implementing change
Issues and concerns	Issues and concerns may be communicated formally and informally and may include: • individual and group concerns • those expressed by and through industrial processes
Gathering and monitoring performance data	Performance data may be gathered and monitored: • manually by individual employees through charts, tally sheets or keypad/board entry • automatically through software, such as SCADA software, ERP systems, MRP and proprietary systems

Unit Sector(s)

Unit sector Competitive systems and practices

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Custom Content Section

Not applicable.

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MSS403011A Facilitate implementation of competitive systems and practices

Modification History

New unit, superseding MSACMC411A Lead a competitive manufacturing team - Not equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required by individuals who facilitate, lead or mentor others in competitive systems and practices implementation in a work area.

Application of the Unit

This unit applies to people responsible for facilitating others in implementing competitive systems and practices in their work. It may apply to formally designated team leaders or people given special roles in the implementation process that go beyond their own work and which involve guiding, facilitating or mentoring others. The unit applies to competitive systems and practices implementation activities at the work area or section level.

The unit requires an individual to integrate a range of competitive systems and practices knowledge and skills as part of their role. The unit covers assisting others to understand and apply a holistic view of their job and their role within an organisation, including the objectives that must be met as part of competitive systems and practices used by the organisation.

This unit requires the application of skills associated with communication, teamwork, problem solving, initiative and enterprise, planning and organising, and self-management. This unit has a strong emphasis on planning and implementation, and also requires an ability to learn from experience and feed new information back into strategies to improve own performance and that of others.

For implementation of competitive systems and practices techniques in an office, the specialist unit *MSS403006A Facilitate implementation of competitive systems and practices in an office*, should be selected instead of this unit.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Facilitate the development of process and competitive systems and practices knowledge	1.1	Ensure necessary technical documentation and information about the process and competitive systems and practices is available
		1.2	Assist and mentor others in accessing information
		1.3	Identify work activities which may inhibit the ongoing development of competitive systems and practices skills and knowledge of others
		1.4	Arrange for the provision of workforce development and training for self and others, as appropriate
		1.5	Encourage others to apply technical knowledge to the improvement process
2	Facilitate commitment to efficiency improvements	2.1	Ensure budgets, operating procedures and other related documentation is available
		2.2	Assist others to apply this information to their work responsibilities

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		2.3	Encourage the identification of waste
		2.4	Encourage an environment where efficiency improvements are recommended by fellow employees
3	Encourage a competitive systems and practices approach to work	3.1	Encourage and, where necessary, develop communications between specialists and work group members
		3.2	Lead development of strategies to monitor and deal with identified waste issues
		3.3	Resource and encourage other employees to identify and take appropriate action on potential problems
		3.4	Arrange for workforce development and training for self and others, as required, in relevant competitive systems and practice procedures and techniques
		3.5	Guide others in relating identified problems to the maintenance strategy, and developing any required changes, to ensure awareness, learning and commitment
4	Implement process and organisation improvements	4.1	Plan the implementation of work group suggestions and externally suggested improvements
		4.2	Facilitate commitment to, and involvement in, the implementation planning of improvements and to follow improvements to their conclusion
		4.3	Encourage the application of the 'plan, do, measure, improve, control' approach to the job
		4.4	Arrange for workforce development and training, as required, to facilitate continued involvement by others in improvement processes
		4.5	Involve work group and other key personnel in identification of skill needs and means of skills acquisition to fill any identified gaps

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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- facilitating goals, activities, communications and access to resources, including process mapping
- solving problems
- identifying waste (muda)
- data gathering and analysis
- explaining and leading others in implementation at the work group level of:
  - value stream mapping
  - 5S
  - Just in Time (JIT)
  - mistake proofing
  - process mapping
  - establishing customer pull
  - kaizen and kaizen blitz
  - setting of key performance indicators (KPIs)/metrics
  - identification and elimination of waste (muda)
- communicating effectively to conduct informal and formal meetings, and to relate to personnel at all levels
- providing effective feedback
- effectively encouraging team spirit and morale
- transferring knowledge and skills through informal one-on-one mentoring

Required knowledge

Required knowledge includes:

- information technology systems used in the organisation
- principles of competitive systems and practices and their application to the organisation, including:
  - value stream mapping
  - 5S
  - JIT
  - mistake proofing
  - process mapping
  - establishing customer pull
  - kaizen and kaizen blitz

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  - setting of KPIs/metrics
  - identification and elimination of waste (muda)
- monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA)software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP), and proprietary systems, which may be used within the organisation
- methods of gathering data against KPIs, such as:
  - waste walk
  - document tagging
  - tracking/log sheets
  - spaghetti diagrams
  - existing information technology and enterprise resource systems (e.g. SCADA, ERP and MRP)
- facilitation techniques to encourage team development and improvement
- organisational policies, plans and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify processes and products of their organisation and work area • analyse current and future skill development needs of team • act as an effective communication link between team and internal and external competitive systems and practices specialists and managers • lead team in identifying efficiency improvements and elimination of waste.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to

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	the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are

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	not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as SCADA software, ERP systems, MRP and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Budgets	Budgets include: • financial • time • materials/products • other business plans which are relevant to the team and the work area
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Categories of waste include:

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	• excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items • activities which do not yield any benefit to the organisation or any benefit to the organisations customers
Key reliability issues	Key reliability issues include those which are most likely to lead to failure, such as: • cleanliness • poor lubrication • incorrect adjustment • poor training and instructions for employees

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS403013A Lead team culture improvement

Modification History

New unit, superseding MSACMC413A Lead team culture improvement - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required by a team leader or other person responsible for developing a culture within a team appropriate for supporting competitive systems and practices.

Application of the Unit

This unit applies where an organisation has embarked on competitive systems and practices and a team leader or other responsible person is required to change or improve the team culture to be consistent with that required to maximise the benefits from competitive systems and practices.

This unit requires the application of skills associated with communication, teamwork, problem solving, initiative and enterprise, planning and organising, and self-management in order to provide leadership in a changing team environment. This unit has a strong emphasis on planning and change management, but also requires an ability to learn from experience and feed new information back into strategies to improve performance.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised

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unit of competency.	text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Facilitate the team's understanding of the competitive systems and practices strategy	1.1	Communicate with all team members the objectives and benefits of the competitive systems and practices strategy
		1.2	Review with team members the techniques and methods that will be used in achieving the competitive systems and practices strategy
		1.3	Using a systems approach, help team members understand how the team fits into the organisation
		1.4	Establish appropriate communication and teamwork within the team and with other teams
		1.5	Develop a work structure with the team that allows for everyone to participate in the application of the competitive systems and practices strategy
2	Facilitate application of knowledge about the importance of controlling variation in competitive systems and practices	2.1	Develop the application of a statistical approach by all team members to all relevant facets of the system with a view to reducing variation
		2.2	Encourage the approach of building quality and ensuring team members assist each other in meeting requirements
3	Facilitate the development of skills and knowledge within the team	3.1	Encourage appropriate training for all team members
		3.2	Involve team members in identification of skill needs and skill gaps, and in development of a strategy for training, skills acquisition and self-improvement so as to ensure awareness, learning and commitment

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4	Facilitate the development of commitment within the team to the competitive systems and practices strategy	4.1	Ensure that the team has sufficient resources and adequate equipment available to meet the requirements of the competitive systems and practices strategy
		4.2	Encourage the adoption of continuous improvement
		4.3	Encourage employee acceptance of responsibility for the quality of their own work
		4.4	Provide continuous feedback and communication of progress at all levels in implementing the strategy
		4.5	Involve team members in relating identified problems and opportunities for improvement to the competitive systems and practices strategy, and involve them in developing any required changes, to ensure awareness, learning and commitment
		4.6	Establish and monitor indicators of team culture

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying and interpreting team quality standards and customer requirements
- identifying the competitive operational practices being implemented by the team
- communicating with others in the team, other team leaders, other employees and external representatives relevant to team competitive systems and practices
- ensuring team awareness of performance against requirements (e.g. through visual management techniques)
- facilitating team competitive systems and practices review activities
- solving problems to root cause
- identifying and accessing sources of assistance if difficulty is experienced with team implementation of competitive systems and practices
- interpreting relevant procedures and instructions
- identifying, analysing and evaluating information from a variety of sources

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Required knowledge

Required knowledge includes:

- competitive systems and practices strategies at a broad level, including theoretical concepts of one or more of:
  - six sigma
  - lean manufacturing/lean operations
  - agile manufacturing/agile operations
  - Just in Time (JIT)
  - supply chain management
  - value stream management
  - total quality
  - proactive maintenance
  - elimination of waste
  - Balanced Scorecard
  - 5S housekeeping
  - visual factory/visual operations
- benefits of:
  - standardised work
  - customer pull
  - value stream mapping
- principles of change management

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the competitive systems and practices used by the team • identify changes to their own work flowing from the implementation of the relevant competitive systems and practices • implement and monitor changes designed to improve team culture • know when and how to seek assistance

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	• make suggestions for improvements.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA)software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Variation	Variation refers to:

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	• variation from quality standards and customer requirements as expressed in production or operations schedules and technical specifications
Systems approach	A systems approach enables a person to see how work gets done, the effect of changes and shows the internal/external relationships through which products and services are produced. It may include considerations of the role and requirements of: • customers • suppliers • employees • other value stream members • members of the public and community groups • other external individual, group or organisation • technical processes and equipment • statutory and regulatory requirements, including occupational health and safety (OHS) and environment legislation and regulations • quality standards
Team culture	Team culture change is the extent to which the culture of the team is aligned to the goals of customers and the organisation. Team culture may be monitored by: • surveys • evaluation of toolbox or other regular meetings • direct discussion with team members • monitoring of other indicators (e.g. error rates and absenteeism) • analysis of root cause related to status of team culture
Work structures	The work team structure may vary (e.g. be self-directed, cross-functional, and so on, and should be appropriate to the job)

Unit Sector(s)

Unit sector Competitive systems and practices

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Custom Content Section

Not applicable.

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MSS403021A Facilitate a Just in Time system

Modification History

New unit, superseding MSACMT421A Facilitate a Just in Time (JIT) system - Equivalent

Unit Descriptor

This unit of competency covers skills and knowledge required to facilitate the implementation/operation of a Just in Time (JIT)/kanban system in a team or work area.

Application of the Unit

This unit applies to a person who needs to monitor the operation of a JIT system and facilitate its working in a team or work area. This will involve liaison with stakeholders as well as examining the data generated. They will need to be alert to potential problems and areas for improvement.

This unit requires the application of skills associated with gathering, analysing and communicating information to facilitate implementation of the JIT system. It requires planning and organising skills and has a strong emphasis on communication and teamwork skills to ensure the JIT system is being effectively implemented. This unit also requires the ability to problem solve and take the initiative to consider performance issues and learn from experience to improve future performance.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills

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unit of competency.	and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Monitor the operation of the JIT system	1.1	Track value of key measures
		1.2	Recognise indicators of poor performance
		1.3	Take appropriate quick fix action
2	Liaise with relevant stakeholders	2.1	Regularly communicate with team or work group members regarding the operation of the JIT system
		2.2	Review JIT key performance indicators (KPIs) with team or work group members
		2.3	Communicate with relevant personnel up and down the value stream regarding the operation of the JIT system
		2.4	Identify issues with stakeholders and take appropriate quick fix action
3	Improve the JIT system	3.1	Identify areas requiring improvement in the JIT system
		3.2	Identify root cause of JIT-related problems
		3.3	Review value of key measures
		3.4	Recognise skill gaps in team members and other stakeholders
		3.5	Determine any other issues in team or work group, other stakeholders and JIT system leading to poor performance indicators
		3.6	Develop appropriate improvement solutions
		3.7	Liaise with relevant people regarding improvement solutions

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3.8 Implement and/or assist with the implementation of the solutions

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying KPIs for JIT system in team or area of responsibility
- analysing the JIT/kanban implementation in the team or area and the relevant sections of the internal and external value stream, including identifying people-related needs and issues
- identifying and implementing quick fix to JIT problems
- using formal problem solving procedures (e.g. root cause analysis (RCA))
- developing formal and informal communication procedures with others in work area, team leaders, other employees and value stream members relevant to JIT implementation
- establishing sources of assistance in the organisation for people experiencing difficulty with competitive systems and practices changes
- interpreting procedures and instructions relevant to own expertise for others
- establishing KPIs for own work

Required knowledge

Required knowledge includes:

- JIT principles relevant to operations and processes in own area or team and in the organisation generally
- procedures for making/recommending improvements
- typical reasons for delays/storages/inventories in the team or area of responsibility and methods of reducing/eliminating them
- skill gap analysis and methods of filling skill gaps
- principles of the operations process relevant to the section/team
- production data generated by the process and its application to JIT

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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Overview of assessment	Evidence should be available of the person's facilitation of the operation of the JIT system and their making of recommendations for/making improvements.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the JIT system and practices used in their team or area of responsibility • identify and monitor JIT key measures • solve JIT-related problems to root cause • implement and monitor JIT-related changes to operations and practices.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge.

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	Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving

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	• run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
JIT	JIT refers to: • a production scheduling concept that calls for any item needed at a production operation (whether raw material, finished item, or anything in between) to be produced and available precisely when needed, neither a moment earlier nor a moment later
Kanban	Kanban is a card or sheet used to authorise production or movement of an item; when fully implemented, kanban operates according to the following rules: • all production and movement of parts and material take place only as required by a downstream operation (i.e. all operations and procurement are ultimately driven by the requirements of final assembly or the equivalent) • the specific tool which authorises production or movement is called a kanban. The word literally means card or sign, but it can legitimately refer to a container or other authorising device. Kanban have various formats and content as appropriate for their usage (e.g. a kanban for a vendor is different than a kanban for an internal machining operation) Kanban is typically applied to batch type operation and the production is measured in units produced. In continuous processing organisations, production is measured in terms of production rate (e.g. kg/h, tonne/day) and rate is increased/decreased according to the flow authorisation which may be a kanban (e.g. ticket, order from a supplier) or may be a SCADA signal from a remote facility (e.g. customer tank) saying that resupply is required or similar
SCADA	SCADA refers to: • a number of systems which automatically collect critical process data, perform required mathematical

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	manipulations on it and then make control decisions and/or give required information to personnel for action
Key measures	Key measures may include: • inventory levels • lead time • In Full, On Time and In Specification (IFOTIS) delivery • productivity/production rate • other measures of pull through the value stream • quality
Quick fix	Quick fix refers to: • action taken to immediately and cheaply control a problem, prevent it getting worse and/or ameliorate its impact, but which does not necessarily solve it long term
Pull system	Pull refers to: • a system of making to demand rather than for stock or to a forecast
Value stream	The value stream begins with the customer and includes all actions (both value-adding and non-value added) by both internal sections/departments and external organisations to meet a customer requirement. Depending on the operations and the customer requirement, stages where value stream actions may occur include: • sales outlet/representative • information gathering, data analysis and research • product design • raw material sourcing • intermediate processing • final assembler/collation/preparation • support services (e.g. accounting, finance and legal) • storage and delivery to customer • after market support

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Unit Sector(s)

Unit sector	Competitive systems and practices

Custom Content Section

Not applicable.

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MSS403030A Improve cost factors in work practices

Modification History

New unit, superseding MSACMT430A Improve cost factors in work practices - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to evaluate the product or process outcomes of a team in terms of their cost components and to be able to determine, in general terms, the cost impacts of alternative actions.

Application of the Unit

This unit applies to a person who is required to assess the relative costs of alternatives and use this as one of the key factors in decision making. Typical decisions include the efficient organisation of own work and that of others in a work area or within a team and the improvement of throughput and cycle times.

Decisions are made within the scope of the authority of the individual and other employees in the area or team and according to procedures.

This unit primarily requires the application of skills associated with communication and information gathering, teamwork and problem solving to analyse the cost components of work processes. Initiative and enterprise, and planning and organising are also required to identify opportunities for improved cost-efficiency. This unit also requires a degree of self-management and learning to effectively operate and maintain skills and performance.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Analyse cost components of work area or team function	1.1	Identify cost components in the product or process
		1.2	Identify costs factors under control of area or employees in the team
		1.3	Identify causes of variability in costs
		1.4	Analyse impact of costs on production or process activities undertaken
2	Improve cost-efficiency of processes and procedures	2.1	Identify methods of improving productivity and/or reducing costs within area or team’s responsibility
		2.2	Determine cost/benefit ratio of alternative methods of improving productivity and/or reducing costs
		2.3	Consult with all relevant stakeholders regarding possible changes
		2.4	Recommend changes which will increase productivity and reduce cost and variability
		2.5	Implement recommended changes in consultation with relevant stakeholders

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

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Required skills

Required skills include:

- identifying fixed and variable costs in products or processes
- analysing costs and determining those that can be controlled by the individuals in an area or team
- analysing costs over time and identifying variability in cost components
- determining cost/benefit ratios
- communicating and negotiating with others on changes using a variety of mediums

Required knowledge

Required knowledge includes:

- cost components of products made
- costs concepts, such as expense, income and cost/benefit
- major cost contributors to product (e.g. energy, materials, labour and distribution, and so on) depending on the product and process)
- the difference between internally and externally controlled costs
- difference between overhead, labour and consumables

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the scope of their own work and the team or area work and relate it to the overall flow of work in the organisation • express cost factors in specific terms (e.g. cost per item, process and task) • identify and express cost factors in basic financial terms • analyse variability in costs and recommend improvements • use cost/benefit to select preferred improvement strategies.
Context of and specific resources	Assessment of performance must be undertaken in a

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for assessment	workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace project(• suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices, • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Cost components	Cost components may include:

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	• fixed and variable costs, such as power/energy, materials, plant and equipment, salary and wages, and office expenses (e.g. telephone) • government taxes and charges
Variability in costs	Variability in costs should be assessed over a suitable time. The time should be sufficient to identify: • fluctuations in variable costs related to different volumes of sales, production or operations • abnormal cost fluctuations due to poor design of product or process, poor scheduling, faults, breakdowns and other waste
Process	Process includes all functions that go to meet customer requirements as well as other required functions (e.g. regulatory related functions). Examples include: • design • production • maintenance • logistics • office processes
Procedures	Procedures may include: • work instructions • standard operating procedures • drawings and specifications • manuals • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the organisation • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations Procedures may be: • written, verbal, computer based or in some other format
Benefits	Benefits should include: • positive benefits as well as negative benefits, such as quality, safety, reliability and similar issues which may be impacted by a cost saving

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Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS403032A Analyse manual handling processes

Modification History

New unit, superseding MSACMT432A Analyse manual handling processes - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to analyse manual handling in terms of its efficiency and safety.

Application of the Unit

This unit applies to an individual who is required to examine the manual handling component of a job and improve it in terms of safety, effort required and efficiency. This may be conducted for a job performed by others or it may be for the person's own job.

This unit primarily requires the application of skills associated with problem solving, initiative and enterprise to identify safe and efficient manual handling, and planning and organising to ensure processes are implemented. This unit also requires communication with, and involvement of, others to ensure they understand the approach and to facilitate training.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

1	Assess manual handling risks	1.1	Identify manual handling hazards in work area
		1.2	Assess risks arising from manual handling hazards
2	Analyse physical effort requirements of job	2.1	Determine basic manual handling requirements of job
		2.2	Analyse requirements in terms of components, such as lift, move, place and hold
		2.3	Analyse items to be handled in terms such as weight, size, shape or other hazards
3	Determine time/effort components of physical effort	3.1	Break required movement pattern down into movement components
		3.2	Determine time and effort requirements for movements
		3.3	Develop alternative movement patterns
		3.4	Determine time and effort requirements for alternative movements
		3.5	Determine handling aids required to assist movement
		3.6	Determine preferred movement pattern
4	Analyse the ergonomics of physical effort	4.1	Analyse the ergonomics of the preferred movement pattern
		4.2	Develop substitute movements for any movement which is not ergonomically sound
		4.3	Determine handling aids required to improve ergonomics of required movements
5	Optimise	5.1	Select movement patterns which are ergonomically

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application of physical effort		sound and time and effort efficient
	5.2	Ensure all relevant people are trained to use these methods
	5.3	Ensure procedures and practices reflect the optimum methods
	5.4	Communicate with team members and involve them in development of alternatives to ensure awareness and facilitate learning

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating with others about work processes and jobs
- identifying ergonomically sound and unsound movements both at a general level and related to individual capability
- analysing manual handling processes
- working cooperatively with others
- demonstrating or arranging to have demonstrated ergonomically correct movements
- applying basic mathematics
- solving problems

Required knowledge

Required knowledge includes:

- relevant occupational health and safety (OHS) Acts and regulations as applied to manual handling
- principles of job and work method design as applied to efficient and safe movement
- principles of work analysis
- principles of ergonomics/safe movement
- aids than can assist with or substitute for manual handling

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • analyse manual handling requirements and risks in jobs • distinguish between ergonomically sound and unsound movement • analyse manual handling movements and risks for an individual • relate manual handling requirements to job efficiency.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using some combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence.

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	In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE)

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	• takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and Responsible Care) • government regulations Procedures may be: • written, verbal, computer-based or in some other format
Manual handling hazards	Manual handling hazards may include: • loads that pose a risk of injury • ergonomically unsound movements • hazard requirements as defined by relevant OHS Acts and regulations, industry standards and best practice
Ergonomically unsound movements	Ergonomically unsound movements may include: • awkward and repetitive movements • carrying, pushing, pulling or lifting of heavy loads • carrying or movement against hard, sharp, slippery or other difficult to grasp loads Ergonomically unsound movements should be assessed against the capabilities of individual workers as what is a sound movement for one worker may be unsound for

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	others depending on physique and individual condition
Ergonomically sound movements	Ergonomically sound movements are movements which decrease the risk of injury. Sound movements will vary according to the load and individual. Examples include: • keeping loads close to the body and near the person's centre of gravity • using diagonal foot positions for lifting • moving loads at waist height rather than directly from the floor

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS403040A Facilitate and improve implementation of 5S

Modification History

New unit, superseding MSACMT440A Lead 5S in a manufacturing environment - Not equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to facilitate the implementation and improvement of the 5S by self and others in a team or work area.

Application of the Unit

This unit applies to individuals who facilitate 5S in a team or work area, including implementation, monitoring and improvement. The facilitation may be undertaken by formally designated supervisory staff, such as team leaders or other individuals in a competitive systems and practices implementation role, who need to provide support and encouragement to others to facilitate the achievement of 5S outcomes in the workplace.

This unit requires the application of skills associated with communication, teamwork, problem solving, initiative and enterprise, planning and organising, and self-management in order to provide leadership in a 5S environment. This unit has a strong emphasis on planning and change management, but also requires an ability to learn from experience and feed new information back into strategies to improve performance.

For planning, implementing and leading the application of 5S in an office environment see unit *MSS403039A Facilitate and improve 5S in an office*.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Facilitate the set-up of 5S	1.1	Assist others to determine what are necessary and unnecessary items in the work area
		1.2	Assist others to determine optimum assigned location for all necessary items
		1.3	Liaise with relevant production and occupational health and safety (OHS) personnel in determining optimum locations
		1.4	Assist others to determine optimum location for unnecessary items
		1.5	Assist others to determine 5S schedule
		1.6	Ensure procedures reflect 5S practices
		1.7	Assist others to achieve the required level of skill
2	Facilitate the implementation of 5S	2.1	Ensure procedures reflect 5S practices
		2.2	Assess skill base of team or work group members in 5S and arrange for any required training
		2.3	Ensure that any damage and/or safety risks reported by the team or work group are addressed through correct mechanisms
3	Monitor 5S	3.1	Check work area for 5S implementation as part of normal routine

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		3.2	Identify non-conformances
		3.3	Negotiate solutions to non-conformances
4	Improve 5S	4.1	Work with others to find areas for improvement
		4.2	Assist others to develop improvement solutions
		4.3	Facilitate the availability of resources required for the improvement solution
		4.4	Facilitate the implementation of the improvement solution

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating with other employees and managers to engender commitment to achieving 5S outcomes, conduct formal and informal meetings and to explain 5S and related concepts
- facilitating team or work area goals, activities and communications and accessing resources
- visualising normal operational procedures in terms of flow and contribution to customer outcomes
- planning and prioritising activities
- problem solving to determine potential improvements to the 5S system
- reading and interpreting the application of operating procedures for jobs within team or target work area
- analysing work practices, procedures and 5S principles to facilitate setting up the 5S system and to identify improvements
- identifying gaps in skills and/or knowledge and options to address them

Required knowledge

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Required knowledge includes:

- principles and purpose of 5S
- methods of identifying waste in the work area, such as:
  - waste walk
  - document tagging
  - tracking/log sheets
  - spaghetti diagrams
  - existing information technology and enterprise resource systems (e.g. Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems
- organisational policies, plans and procedures
- processes for identifying and addressing skill gaps
- ways of encouraging team members to find and suggest areas for improvement
- methods of identifying and evaluating options and making/recommending improvements
- methods of accessing required resources
- OHS requirements relevant to team and work area

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the scope of the services and/or functions supplied to and by the team or work area and the deliverables expected by customers, including the ultimate customer • facilitate a systematic approach to implementing 5S • lead and motivate others in achieving 5S outcomes and making improvements to the 5S systems • set up systems for monitoring and improving 5S implementation • manage non-conformances in implementation of 5S.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to:

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	• workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with

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training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as SCADA software, ERP systems MRP and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plant

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	• good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and Responsible Care) • government regulations Procedures may be: • written, verbal, computer-based or in some other format
5S	5S is a system of work organisation originally developed in Japan based around a close translation of the five stages in the housekeeping approach is: • sort • set in order • shine • standardise • sustain
Sort	Sort involves keeping only what is absolutely necessary for the work processes that comprise the job and includes: • clearing the work area of all non-essential items Non-essential items are items not required to either produce product, conduct process or operations or make required adjustments to equipment during process or operations
Set in order	Set in order includes: • assigning required equipment and materials appropriate locations in the work area
Shine	Shine includes: • keeping the work area clean at all times. This should be carried out to a regular daily schedule against allowed time, usually at the end of the day or of a particular process Cleaning includes: • noting any signs of wear, damage, leakage, safety risks or other issues that require immediate attention
Standardise	Standardising includes: • activities that help maintain the order and the housekeeping standards • using procedures and checklists developed from a procedure

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Sustain	Sustain includes: • making sure that daily activities are completed every day regardless of circumstance • undertaking inspections, including: • informal inspections that should be carried often, at least weekly • generating continuous improvement actions from daily activities • formal inspections that should be carried out at least monthly
Items in work area	Items in work area may include: • tools • jigs/fixtures • materials/components • plant and equipment • manuals • personal items (e.g. bags, lunch boxes and posters) • safety equipment and personal protective equipment • other items which happen to be in the work area
Team	The term team is used to apply to all individuals in the target work area who are involved in the implementation of 5S. The team may or may not be a formally designated team working to a team leader
Work area	The work area includes: • all areas where aspects of the job are performed and that are under the direct control of the employee. In a team environment 5S should be applied to all work areas under the control of the team
Target work area	The target work area may be identified as a physical and/or virtual work space: • used by a person, a team or a cross-functional group • common to part/s of a process or value stream (already defined) • shared by people who undertake a defined procedure or set of procedures • needed to support a particular function
Appropriate place	Appropriate places may include areas designated for: • recycling • rubbish removal

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	• staff room/lunch room/kitchen • storage • holding area until status is confirmed
Optimum assigned location	The optimum assigned location may include: • making changes to the layout of furniture, equipment and personnel in order to facilitate the smooth and continuous flow of work through process steps taking into account OHS considerations
Non-conformance	Non-conformance includes: • incorrect or incomplete application of 5S procedures, including any daily tasks, scheduled inspections and continuous improvement procedures

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS403041A Facilitate breakthrough improvements

Modification History

New unit, superseding MSACMT441A Facilitate continuous improvement in manufacturing - Not equivalent

Unit Descriptor

This unit of competency covers the knowledge and skills required to facilitate implementation of discrete targeted improvement activities to achieve breakthrough improvements in selected processes, operations or products. Typically this approach is used for improvements in areas of waste identified through value stream mapping.

Application of the Unit

This unit applies to team leaders and others who are providing guidance and support to assist a team of employees to identify improvements that can be implemented to operations, processes or products in a brief intensive project.

The unit also covers ensuring that the improvements are sustained. The process of achieving breakthrough improvements is often called kaizen blitz in lean terminology.

This unit assumes that one or more processes and operations have been mapped. *MSS403033A Map an operational process* may also need to be selected if this is not the case.

For facilitation of breakthrough improvements in an office see unit *MSS403043A Facilitate breakthrough improvements in an office.*

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Prepare for improvement event	1.1	Engage team members in the improvement event
		1.2	Identify process or processes to be targeted in the improvement event
		1.3	Assist team members to identify how their own roles contribute to value to the customer
		1.4	Assist team to identify the boundaries of the event, including any imposed exclusions
		1.5	Identify key process indicators and other information required for improvement event
		1.6	Identify skill needs for personnel engaged in breakthrough improvement event and arrange for any required training
		1.7	Establish communication processes with sponsor and stakeholders
2	Identify improvements	2.1	Assist team to review current processes, operations or products and identify options for radical improvements
		2.2	Facilitate team activities and other relevant personnel to evaluate the options and agree on improvements to be made
		2.3	Encourage and assist team and others to plan the activities and identify metrics to be monitored
		2.4	Facilitate allocation of resources and strategies to manage impact on routine work

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3	Facilitate the event	3.1	Assist team to gather baseline data on the selected metrics
		3.2	Assist team to identify and address barriers to making the improvements
		3.3	Monitor team dynamics and facilitate team focus and cooperation
		3.4	Liaise with sponsor to communicate progress and maintain their support
4	Evaluate improvements	4.1	Assist team to gather and interpret data on the metrics
		4.2	Facilitate team activities to evaluate the outcomes of the event
		4.3	Identify causes for areas of poor performance from changes and identify any additional changes to address them
		4.4	Report to sponsor and other stakeholders on the outcomes of the event
5	Embed improvements	5.1	Establish mechanisms to ensure new systems and/or practices are communicated to relevant personnel
		5.2	Motivate team to apply the new systems and/or practices and sustain improvements
		5.3	Ensure the new systems and/or practices are reflected in relevant procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

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- facilitating groups of people who may not normally work together
- analysing information and data to identify variation and evaluate improvements
- measuring and calculating performance variables
- facilitating team goals, activities, communications and accessing resources
- planning and prioritising team activities
- solving problems to root cause
- identifying waste (muda)
- communicating with personnel at all levels in relation to team activities and improvement projects
- visualising normal operations and procedures in terms of flow and contribution to customer value
- contributing to procedure review and/or development
- identifying gaps in skills and/or knowledge and options to address them

Required knowledge

Required knowledge includes:

- team and organisation deliverables and processes used to achieve them
- how organisation operations and processes contribute to the value stream
- types of waste (muda) and imposed exclusions
- organisational policies, plans and procedures
- methods of identifying and evaluating options
- occupational health and safety (OHS) requirements relevant to the target work areas

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • interpret operations, processes and products in terms of value to the customer • identify, analyse and evaluate information from a variety of sources to identify opportunities for breakthrough improvements • lead and motivate others in planning, implementing and sustaining improvements.
Context of and specific resources	Assessment of performance must be undertaken in a

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for assessment	workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Team	Team for the purposes of this unit means any group of employees engaged in a breakthrough improvement

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	event. Examples include: • a permanent formally identified team • a sub-group of a team • a specially established group for the breakthrough event (e.g. a combined production/administration/ logistics group convened for a breakthrough event addressing delivery issues)
Scope and benefit statements	Scope and benefit statements of improvement project may include: • description of the business • the target work process • what key stakeholders seek from the improvement project • a mission for the event • a set of goals • a statement of the do's and don'ts for the improvement project
Boundaries	Boundaries define the extent and limits of the breakthrough improvement event. Typically they define: • the start and end point of the process being targeted • the steps of the process to be included and excluded • specific job roles or related processes to be included or excluded • timeframe for the event
Sponsor	Sponsor includes: • a person who is committed to achieving improvements and who has the authority to approve and allocate resources to support the activities and ensuing changes. Typically the sponsor will be a middle or senior manager in the organisation or the business owner
Breakthrough improvement	A breakthrough improvement (also known as kaizen blitz) is one that delivers a better ratio of value-add to non-value add from the customer perspective. It is characterised by: • using a formal process • being a discrete targeted activity that is achieved in a relatively short timeframe • delivering significant level of improvement
Mechanisms	Mechanisms to communicate and sustain improvements may include:

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	• scheduled audits • regular monitoring and/or reporting activities • use of visual aids, such as targets and progress boards, process charts and procedure posters • communications, such as standing items for team meetings, email reminders or updates
Imposed exclusions	Imposed exclusions are wastes (muda) that are required but do not add value. They should be formally identified as muda in the competitive systems implmentation. Examples include: • equipment excluded from efficiency or layout review because of budget constraints • regulatory requirements that do not add value • organisation requirements, policies or procedures beyond the influence of the team
Key process indicators	Key process indicators may include: • statistical process control data/charts • orders • lost time, injury and other OHS records • equipment reliability charts
Team	Team includes: • formally designated teams • informal groups of employees • other stakeholders who may be brought together for a breakthrough improvement event

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS403051A Mistake proof an operational process

Modification History

New unit, superseding MSACMT451A Mistake proof a production process - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to make changes to own and others work in a work area which prevents errors and/or backsliding to a pre-improvement level of practice.

Application of the Unit

This unit applies to a person who needs to analyse a process that a team is responsible for and determine methods of mistake proofing it (e.g. ensuring it only produces product within an acceptable range or error-free transport and storage of goods). The person will typically be a technical expert, team leader or be in a role where they have sufficient technical understanding of processes in their own work and that of others to be able to mistake proof the production process in their area. After improvement activities have been undertaken these improvements need to be sustained.

This unit requires the application of skills associated information gathering and analysis. Initiative, enterprise and problem solving are also required to identify mistakes and determine strategies for eliminating them. This unit also requires communication and teamwork skills to ensure mistake proofing strategies are implemented and self-management and learning skills to continually reflect on and integrate feedback about the effectiveness of strategies.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Analyse process	1.1	Identify sources of variability/non-conformance in the process
		1.2	Identify critical control points in process
		1.3	Analyse causes of variability/non-conformance
2	Develop preventative techniques/systems	2.1	Liaise with team members and other people to develop mistake proof options for performing operation
		2.2	Test and validate mistake proofing options
3	Implement permanent fix	3.1	Liaise with relevant people to have systems/procedures changed to implement solution
		3.2	Liaise with relevant people to implement the solution
		3.3	Liaise with relevant people to ensure self and others in the team or work area have an appropriate skills set
		3.4	Follow through to ensure implementation occurs
4	Monitor implementation	4.1	Critically observe the implementation
		4.2	Compare the results of the implementation against the expected outcomes
		4.3	Modify solution to improve outcomes

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		4.4	Ensure procedures reflect change
		4.5	Ensure training/assessment reflects change
		4.6	Audit change at agreed period/cycle
		4.7	Take action on any observed deviation
5	Seek improvements	5.1	Observe changes
		5.2	Analyse process again, if required, to ensure improvements are sustained

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating with team or work group members, technical support personnel and other relevant staff
- explaining mistake proofing and related concepts
- facilitating input of others and encouraging acceptance of changes
- analysing and visualising operations in terms of flow and contribution to customer outcomes
- solving problems to determine root cause of errors and possible solutions
- analysing and interpreting information about errors and mistake proofing options in terms of cost, feasibility, regulations and value to the customer
- suggesting design changes to operations and products that eliminate the potential for errors
- suggesting mechanisms or procedures that warn of errors where operations cannot be designed to eliminate errors,

Required knowledge

Required knowledge includes:

- mistake proofing concepts, including, in priority order:
  - eliminate the possibility of the error via changes to the process
  - prevent the error from occurring via physical or virtual barriers
  - reduce likelihood of the error by encouraging correct action

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  - mitigate the impact of the error if it does occur
- understanding of processes undertaken by team
- factors in the processes which may cause variability
- methods of controlling the variability in the process
- mistake proofing methods relevant to the process/product

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • analyse variability and non-conformances • identify, analyse and evaluate information from a variety of sources to identify errors and options for mistake proofing • facilitate implementation of mistake proofing activities that reduce waste • facilitate sustaining the mistake proofing activities.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace

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	• workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related

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	operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Mistake proofing	Mistake proofing is based on the concept of zero defects. The first priority is to eliminate the possibility of an error occurring. However, where this is not feasible mistake proofing can be used to reduce the occurrence of errors and/or to minimise their impact. Mistake proofing should target an error in the following priority order: • eliminate the possibility of the error via changes to the process • prevent the error from occurring via physical or virtual barriers, • reduce likelihood of the error by encouraging correct action (e.g. through warning systems) • mitigate the impact of the error if it does occur Mistake proofing is also called error proofing or baka-yoke or poka-yoke
Options for mistake proofing	Factors to consider when prioritising options for mistake proofing will vary according to the process and may include: • success rate in eliminating errors

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	• feasibility • skills required by employees • cost • capacity to reduce waste
Procedures	Procedures may include: • all work instructions • standard operating procedures • formulas/recipes • batch sheet • temporary instructions and similar instructions provided for the operation of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations Procedures may be: • written, verbal, computer-based or in some other format

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS404050A Undertake process capability improvements

Modification History

New unit, superseding MSACMT450A Undertake process capability improvements* - Equivalent

* New prerequisite *MSS404052A Apply statistics to operational processes* superseding MSACMT452A Apply statistics to processes in manufacturing

Unit Descriptor

This unit of competency covers the skills and knowledge required to make process capability improvements, including analysing data from the process, developing improvements to eliminate variation due to assignable causes, and then implementing actions.

Application of the Unit

This unit applies to a person who reviews a range of process capability data and information, makes/arranges for changes to be made to procedures, equipment or process and then recalculates the process capability and monitors resulting improvement actions. The person will typically be a technical expert, team leader or be in a role where they have sufficient technical understanding of processes in their own work and that of others to be able to suggest and justify process capability improvements.

Process capability may have been determined using either a six sigma or three sigma processes. This unit applies to the application of statistical methods and the determination of capability based on those methods. Other related units may be *MSS404052A Apply statistics to operational processes* and *MSS404053A Use six sigma techniques*

This unit primarily requires the application of skills associated with communication, information gathering and analysis. Initiative, enterprise and problem solving are also required to identify opportunities to improve process capacity. This unit also requires aspects of self-management and learning to validate own analysis.

For a qualitative approach to improvement (one not using statistics) see *MSS403051A Mistake proof an operational process.*

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

MSS404052A Apply statistics to operational processes

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Obtain required data	1.1	Identify process for study
		1.2	Obtain/organise process to obtain required data/information
2	Analyse information	2.1	Analyse data and determine assignable causes
		2.2	Develop possible improvements to eliminate assignable causes
		2.3	Incorporate own experience and learning into proposed process improvement proposals
		2.4	Develop process improvement proposals
3	Improve process capability	3.1	Obtain required authorities to implement improvements
		3.2	Liaise with relevant people to implement improvements
		3.3	Obtain/organise required data for improved process

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3.4 Recalculate process capability

3.5 Implement revised data collection/processing and new capability information

3.6 Monitor improvement actions and make adjustments, as necessary

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- performing relevant mathematical operations
- identifying and using relevant statistical methods
- communicating and explaining data- related changes and procedures to individuals and groups
- negotiating with other employees and managers on proposed improvement actions
- analysing procedures and data to establish variation
- solving problems to root cause where assignable cause of variation is not obvious
- working in a team
- using computer software relevant to required analyses and process

Required knowledge

Required knowledge includes:

- data collection methods
- data processing techniques required
- variability and normal distribution
- three sigma or six sigma processes, as relevant
- random and non-random results (recognition of assignable causes)
- causes of different types of non-random results
- causes of random variation
- process understanding sufficient to translate the data into variations in the process and determine methods of controlling them

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • analyse process information • calculate process capability/trial limits • improve process capability (or organise for it to be improved) • analyse revised process information and recalculate process capability.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence In all cases it is expected that practical assessment will

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	be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time

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	• process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Process capability	Process capability is: • the measurable ability of a process to reliably produce within calculated limits (the limits depend on the variation of the process)
Variation	All processes have variation. The approach in this unit is to separate random variation (no assignable cause) from non-random variation (which has an assignable cause). By finding and eliminating assignable causes, total variation is reduced and process capability will be improved
Six sigma	Six sigma refers to: • a statistical tool for recording defects and determining capability. Six sigma limits equate to 3.4 defects per million opportunities for each product or service transaction. Six sigma is also used as a general term covering a competitive systems and practices approach. Six sigma training typically covers several units of competency in this Training Package
Three sigma	Three sigma refers to: • a traditional statistical process control. Three sigma limits equate to 3 defects per thousand opportunities for each product or service transaction
Required data	The calculation of three sigma or six sigma limits requires process data. The data required depends on the nature of the limits being calculated
Assignable cause	Any non-random variation is said to have an ‘assignable cause’. The methods of data analysis common to statistical capability analysis as well as other methods of

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	root cause analysis should be used to determine the cause of this non-random variation
Improved process capability	Improvements to process capability result from eliminating the causes of non-random variation. The improvements made may be: • as a result of continuous improvement with the process capability being recalculated periodically • as a result of an improvement project with the process capability recalculated as part of that project
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations Procedures may be: • written, verbal, computer-based or in some other format

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS404052A Apply statistics to operational processes

Modification History

New unit, superseding MSACMT452A Apply statistics to processes in manufacturing - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to apply statistical theory and principles to the analysis and control of processes and operations.

Application of the Unit

This unit applies to a person working in an organisation applying statistical process control on processes or operations. The statistical process control will usually be used to monitor the processes or operations and determine when action needs to be taken. The appropriate action will then be taken in accordance with standard procedures.

The unit includes applying knowledge of frequency distribution and variation to the data/chart to distinguish between random and non-random variation and assumes understanding of the process and/or equipment to help interpret those results.

This unit primarily requires the application of skills associated with gathering and analysing data and communicating statistical information to others. This unit also has a strong emphasis on problem solving, initiative and enterprise, planning and organising, and self-management to solve problems and manage processes.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Collect process data	1.1	Interpret sampling scheme
		1.2	Obtain measurements in accordance with standard procedures
		1.3	Handle data, as required
2	Interpret data	2.1	Plot data on appropriate control chart
		2.2	Distinguish between random and non-random patterns of results
		2.3	Identify results outside the control limits
		2.4	Recognise situations requiring action
		2.5	Take appropriate action in accordance with standard procedures
		2.6	Determine cost of non-conformance
3	Calculate control limits	3.1	Consult relevant stakeholders to determine appropriate limits
		3.2	Use relevant methods to calculate/revise control limits
		3.3	Plot limits on control chart
		3.4	Explain impact of limit to relevant stakeholders

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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- applying a range of sampling procedures
- analysing samples and data for variation, relevance, reliability and representativeness
- problem solving the causes of variation in a process
- communicating with other employees to obtain samples/data and to explain results and limits
- plotting or documenting results
- undertaking calculations, including:
  - basic arithmetic functions
  - mean, range, mean of means, standard deviation (using appropriate calculation aids)
- using statistics to support process and operations control

Required knowledge

Required knowledge includes:

- sampling techniques
- purpose of sampling and measurement
- random, systematic and stratified sampling
- purpose of replication of data for statistical control
- samples, populations, finite and infinite populations and the differences
- methods of calculating means, standard deviations and the like and their purpose in statistical control
- the meaning of broad/narrow frequency distributions/range/standard deviations and skewed distributions in process terms
- concept of limits, including:
  - 1 sigma warning limits
  - 2 sigma warning limits
  - 3 sigma control limits
  - 6 sigma limits
- types of control charts and their applications to different types of process/product and for different purposes
- process causes of variation and typical cause types of non-random variation
- non-process (e.g. measurement) causes of variation
- recognition of stable and unstable processes
- causes of stability/instability in the process

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- calculation of control limits/process capability and the applications of different control limits
- the standard distribution curve and confidence limits

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • follow sampling procedures • apply basic statistical processes • analyse data to identify variations and non-conformances • plot or document results.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning

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	• reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen)

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	• breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Sampling scheme	Sampling scheme may include: • sampling for attributes or sampling for variables • batch, continuous or custom made products • number of items/samples • size of sample • timing of sampling • location of sampling points • type of sample • number/type of measurements to be done on each sample • sampling equipment • measurement/testing equipment/methods
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/ recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations Procedures may be: • written, verbal, computer-based or in some other

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	format
Handle data	Handle data may include: • calculating means, ranges, mean of means and standard deviations (using appropriate calculation aids) • entering data into a software package • recording data either in writing or electronically • other required manipulations of the data
Control chart	Control charts may include: • run • tally • mean/range • attributes • other relevant charts
Random	Random variation is the term used in statistical control to refer to those variations for which no cause can be found
Non-random	Non-random (also called identifiable cause, assignable cause or special cause) are those variations for which a cause can be found and so the cause of the variation eliminated. Non-random variation may also be used to predict possible breaches of the control limits
Control limits	Control limits (also referred to as process capability) are those limits within which the process will operate if it is 'under control'
Cost of non-conformance	Cost of non-conformance includes: • reprocessing/rework • expediting • unplanned service • excess inventory • complaint handline • downtime • returns • scrap • labour costs • material costs • infrastructure costs/overhead • utility costs
Appropriate limits	Appropriate limits may include:

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	• 1 sigma warning limits • 2 sigma warning limits • 3 sigma control limits • 6 sigma limits

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS404060A Facilitate the use of planning software systems in a work area or team

Modification History

New unit, superseding MSACMT460A Facilitate the use of planning software systems in manufacturing* - Not equivalent

* Prerequisite *MSACMT260A Use planning software systems in manufacturing* - removed

Unit Descriptor

This unit of competency covers the skills and knowledge required to facilitate the use of planning software in an organisation in a person's work area or team. These systems are known by various generic names, such as Enterprise Resource Planning (ERP), Materials Resource Planning (MRPII, MRP III etc.) or by proprietary names.

Application of the Unit

This unit applies to a person who will access the planning software system for their own work, but will also need to provide support and organise skill development programs for their team or work group members. The person will typically be a technical expert, team leader or be in a role where they have sufficient technical understanding of processes in their own work and that of others to be able to facilitate the use of the planning software system.

The planning software system will be used routinely in the work of the team or work group.

This unit primarily requires the application of skills associated with using communication technology and supporting team use of planning software. Problem solving, initiative and enterprise, and planning and organisational skills are required to ensure that planning software is used efficiently. This requires aspects of learning and self-management to ensure own performance and that of the team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Identify scope of planning software	1.1	Identify categories of information held by planning software
		1.2	Identify information categories relevant to team and area processes
		1.3	Identify range of information able to be provided to planning software by team or work group
		1.4	Identify range of information able to be provided to team or work group by planning software
2	Communicate using the planning software system	2.1	Send and receive information using planning software
		2.2	Send and receive messages using planning software
3	Make decisions using planning software	3.1	Interrogate the planning software system to find required current, historical or predicted information
		3.2	Take actions appropriate to the information in accordance with procedures
4	Monitor the use of	4.1	Routinely monitor planning software information

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	planning software	4.2	Review performance and use of planning software with team
5	Support others to use planning software	5.1	Regularly communicate with team or other work group members, both using planning software and face to face
		5.2	Identify improvements required
		5.3	Take appropriate actions to implement improvements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- entering and receiving information via planning software terminals
- communicating with team and organisation planning software support personnel
- engaging and motivating team in use of planning software
- identifying team or work group area information requirements
- identifying scope of information relevant to team and area available in planning software by categories
- planning and organising improvements in team's use of planning software

Required knowledge

Required knowledge includes:

- hierarchy of planning software system and operation
- information available from/through the planning software system
- query facilities and information analysis capabilities offered by planning software
- support/training/skill development mechanisms available for access by team members

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

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performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify team or work group area information requirements and relate to planning software categories • lead and motivate others in using planning software • ensure information sent to planning software is accurate and appropriate • obtain regular and one-off information from planning software • make decisions using planning software generated information.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence.

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	In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, ERP systems, MRP and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time

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	• process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Planning software	Planning software is a general term applied to a number of software systems which integrate a range of business information, such as: • sales/order taking • finance/accounting • logistics • maintenance • human resources • production It is frequently referred to by names such as ERP or MRP/MRPII. In some cases it can be integrated with engineering applications, such as SCADA systems. In such cases the unit MSS402061A Use SCADA systems in operations may also be required
Information and messages	Information and messages able to be sent and received via the planning software will vary between programs and organisations. This unit assumes that a range of discretion is available to the team leader over the information and messages that can be sent or received. Examples of information and message categories include: • orders • production/operations processes • scheduling (e.g. daily/weekly) • finance and accounting • human resources (e.g. rosters, reserves, training completed and scheduled) • quality requirements • customers • suppliers

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Value stream	The value stream begins with the customer and includes all actions (both value-adding and non-value added) by both internal sections/departments and external organisations to meet a customer requirement. Depending on the operations and the customer requirement stages where value stream actions may occur include: • sales outlet/representative • information gathering, data analysis and research • product design • raw material sourcing • intermediate processing • final assembler/collation/preparation • support services (e.g. accounting, finance and legal) • storage and delivery to customer • after market support

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS404061A Facilitate the use of SCADA systems in a team or work area

Modification History

New unit, superseding MSACMT461A Facilitate SCADA systems in a manufacturing team or work area* - Not equivalent

* Prerequisite *MSACMT261A Use SCADA systems in manufacturing* - removed

Unit Descriptor

This unit of competency covers the skills and knowledge required by a team leader or technical expert to personally use and facilitate the use of System Control and Data Acquisition (SCADA), or other similar systems, and support the team in their use of SCADA.

Application of the Unit

This unit applies to team leaders and others who are providing guidance and support to assist employees to use SCADA. The person will access the SCADA system for their own work, but will also need to provide support and organise skill development programs for their team members.

This competency is also relevant to maintenance personnel using a SCADA system to coordinate maintenance activities.

This unit primarily requires the application of skills associated with using communication technology and supporting team use of SCADA systems. Problem solving, initiative and enterprise, and planning and organisational skills are required to ensure that system is used efficiently. This requires aspects of learning and self-management to ensure own performance and that of the team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Identify scope of SCADA system	1.1	Identify categories of information held in and control options of SCADA system relevant to team or area
		1.2	Identify range of information able to be provided to SCADA system by team
		1.3	Identify range of information able to be provided to team by SCADA system
		1.4	Identify team or area functions impacted by SCADA system
2	Communicate using SCADA system	2.1	Send and receive information using SCADA
		2.2	Send and receive messages using SCADA
3	Make decisions using SCADA	3.1	Interrogate the SCADA system to find required current, historical or predicted information
		3.2	Take actions appropriate to the information
4	Monitor the use of SCADA	4.1	Routinely monitor SCADA information
		4.2	Identify poor uses of SCADA system within team and system inadequacies
		4.3	Identify system improvements required

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		4.4	Take appropriate action to improve SCADA system and its use
5	Support team use of SCADA	5.1	Regularly communicate with team, both using SCADA-based communication and face to face
		5.2	Identify skill improvement needs
		5.3	Identify team members who require additional support
		5.4	Take appropriate action to provide support

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- entering and receiving information via SCADA terminals
- communicating with team and organisation SCADA support personnel
- engaging and motivating team in use of SCADA system
- identifying team or work area information requirements
- identifying scope of team or area processes controlled by SCADA system
- planning and organising improvements in team's use of SCADA

Required knowledge

Required knowledge includes:

- hierarchy of SCADA system and operation
- information available from and controls exercised by/through the SCADA system
- query, control and other facilities and information offered by SCADA
- support/training/skill development mechanisms available for access by team member

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify team or area information and operations requirements and relate to SCADA system • lead and motivate others in using SCADA system • obtain regular and one-off information from SCADA system • make decisions using SCADA generated information.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will

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	be combined with targeted questioning to assess the underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time

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	• process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
SCADA	SCADA is a general term applied to a number of systems which automatically collect critical process data, perform required mathematical manipulations on it and then make control decisions and/or give required information personnel for action. SCADA systems are often used in manufacturing but can also be used in other industries. In the continuous sector, the SCADA system is sometimes integrated into other sophisticated computer control systems, such as Distributed Control System (DCS) and these systems do merge in advanced systems. These organisations may simply refer to their SCADA as the DCS or other similar term (such as the proprietary name of the computer system)
Value stream	The value stream begins with the customer and includes all actions (both value-adding and non-value added) by both internal sections/departments and external organisations to meet a customer requirement. Depending on the operations and the customer requirement stages where value stream actions may occur include: • sales outlet/representative • information gathering, data analysis and research • product design • raw material sourcing • intermediate processing • final assembler/ collation/preparation • support services (e.g. accounting, finance and legal) • storage and delivery to customer • after market support

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Unit Sector(s)

Unit sector	Competitive systems and practices

Custom Content Section

Not applicable.

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MSS404081A Undertake proactive maintenance analyses

Modification History

New unit,superseding MSACMT481A Undertake proactive maintenance analyses - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to undertake the most common forms of analyses associated with predictive/preventative/reliability centred maintenance strategies.

Application of the Unit

This unit applies to a technical expert (usually an engineer, technician or tradesperson) who is required to undertake analyses for the purpose of predictive/preventative/reliability centred maintenance as part of a competitive systems and practices strategy.

This unit primarily requires the application of skills associated with communication, teamwork, problem solving, initiative and enterprise, and planning and organising in order to undertake maintenance analyses. This is normally done in the context of using computer technology, and requires aspects of learning and self-management to ensure team involvement and facilitation of learning.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised

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unit of competency.	text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Liaise with operator	1.1	Establish a relationship with the operator of equipment/plant
		1.2	Ensure the operator has the required skills and resources to keep the equipment/plant clean
		1.3	Ensure the operator is able to effectively monitor the operation of the equipment/plant
		1.4	Regularly communicate with operator about the overall equipment effectiveness (OEE) of their equipment/plant
		1.5	Involve operator, team leader and other key personnel in identification of skill needs and means of skill acquisition to fill any identified gaps
2	Analyse history	2.1	Analyse mean time between failures (MTBF) from maintenance records
		2.2	Analyse performance data of the equipment/plant
		2.3	Identify causes of changes to historic trends/status
		2.4	Determine methods of ensuring causes of improvements and resolution of deterioration are locked in
3	Undertake failure mode effects analysis (FMEA) or similar failure effects analysis	3.1	Undertake analysis
		3.2	Record results of analysis
		3.3	Investigate methods of eliminating possibility of failure and/or minimising the impact of the failure
		3.4	Liaise with operator, team leader and other key personnel regarding possible solutions

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		3.5	Select most appropriate solution
		3.6	Implement selected solutions
4	Undertake condition monitoring analysis	4.1	Obtain data for condition monitoring analysis
		4.2	Interpret condition monitoring data
		4.3	Predict required maintenance type and timing from condition monitoring data
		4.4	Liaise with operator, team leader and other key personnel regarding implications of condition monitoring report
		4.5	Involve team members in development of changes to maintenance strategy to ensure awareness, learning and commitment

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating with operators and team leaders in a variety of situations and with different media
- adapting personal communication strategy to different levels of operator and team leader literacy and numeracy
- working in formal and ad-hoc teams to undertake proactive maintenance related analyses
- analyse data to determine trends, variations, equipment history and to prioritise methods of eliminating or minimising equipment failure
- solving problems to root cause
- applying basic arithmetic and statistical methods
- planning for effective data collection
- reading and interpreting engineering specifications/drawings
- reading and interpreting charts and diagrams
- using information system terminals and computer
- recording data in hard or soft formats

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Required knowledge

Required knowledge includes:

- cleaning needs, techniques and principles of equipment in area of responsibility
- methods of assessing operator and maintenance skill gaps and filling them
- techniques for determining MTBF or similar
- techniques for undertaking FMEA or similar
- underpinning principles of competitive systems and practices strategies being implemented and how to adapt them to maintenance
- root cause analysis
- techniques to analyse condition monitoring data

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify and analyse data and other information on the historical performance of equipment • involve operators, maintenance and other stakeholders in decisions on proactive maintenance strategies • identify root cause of failure and deterioration in equipment performance • select and implement failure elimination or minimisation solutions.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to

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	production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations

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	• agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • OEE • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
OEE	OEE is the combination of the main factors causing loss of productive capacity from equipment/plant and is: *OEE = availability x performance x quality rate* where: • availability takes into account losses due to breakdown, set up and adjustments • performance takes into account losses due to minor stoppages, reduced speed and idling • quality rate takes into account t losses due to rejects, reworks and start-up waste

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MTBF	MTBF is one key measure of the effectiveness of a maintenance procedure, and is an indicator as to whether root causes are being found and resolved. If MTBF is reducing, then it is an indicator that the maintenance regime is failing. There are many possible causes of any problem. Eliminating some will have no impact, others will ameliorate the problem. However, elimination of the root cause will eliminate the problem. There should only be one root cause for any problem and so the analysis should continue until this one cause is found. Elimination of the root cause permanently eliminates the problem. Depending on the equipment, operations and procedures of the organisation, alternative statistical records of maintenance and maintenance related events may be substituted for MTBF providing they relate strategies for improving OEE.
FMEA	FMEA is a systematic approach that identifies potential failure modes in a system, product, or operations/assembly operation caused by either design or operations/assembly process deficiencies. It also identifies critical or significant design or process characteristics that require special controls to prevent or detect failure modes. FMEA is a tool used to prevent problems from occurring. Some industry sectors have highly adapted forms of FMEA and may practice traditional FMEA in say their routine maintenance while using another technique, such as Hazard and Operability Studies (HAZOP) for design and modification. HAZOP is a form of FMEA which has been practiced by the process industries for over 30 years and examines the implications of changes in process conditions to process stability.
Condition monitoring	In this unit condition monitoring is used to describe the process of analysing the implications of condition monitoring data for proactive maintenance, whether it be obtained from non-destructive testing (NDT) reports, visual assessment by experts, diagnostic reports obtained from SCADA or other enterprise or equipment software and product or process quality analyses. It does not require the actual undertaking of the NDT or condition monitoring assessment or test. If this is required appropriate units from other Training Packages will be

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	required.

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS404082A Assist in implementing a proactive maintenance strategy

Modification History

New unit, superseding MSACMT482A Assist in implementing a proactive maintenance strategy - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required by a maintenance person to assist in the implementation of a proactive maintenance strategy in an organisation. This unit includes the interaction between a maintenance worker and operators, as appropriate.

Application of the Unit

This unit applies to a maintenance person in an organisation that has adopted or is implementing total preventative/productive maintenance (TPM), reliability centred maintenance (RCM) or similar strategies. As part of this, the maintenance person is expected to assist in the implementation by determining appropriate maintenance related schedules and also by providing maintenance related assistance to non-maintenance personnel, such as assisting production personnel to fulfil their role in the TPM/RCM strategy.

This unit requires the application of skills associated with problem solving and initiative and enterprise in order to analyse maintenance requirements. Communication, teamwork and planning and organising skills will be required to implement reliability strategies. This requires aspects of self-management to ensure improvement of own performance and learning.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Develop components of reliability strategy for a work/plant area	1.1	Determine manufacturer's recommended inspection, servicing and related schedules for relevant plant
		1.2	Consult with relevant people with regard to appropriate inspections, services and schedules
		1.3	Discuss any conflicts with relevant people and seek resolution of conflicts
		1.4	Develop schedules in liaison with relevant people
		1.5	Identify inspections and servicing which may be done by operations personnel in liaison with relevant stakeholders
2	Assess current practice for maintenance implications	2.1	Identify the overall equipment effectiveness (OEE) or other organisation targets for equipment/plant
		2.2	Evaluate procedures for plant/equipment reliability implications
		2.3	Discuss current practices with relevant people to determine any plant/equipment reliability implications
		2.4	Recommend changes to improve plant/equipment reliability in accordance with procedures
3	Assist in implementing the reliability strategy	3.1	Arrange for schedules to be incorporated in relevant work plans
		3.2	Identify training needs in discussion with relevant

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personnel

3.3 Assist personnel to develop required skills for inspections/servicing within scope of authority

3.4 Collect data/information as required by own work plan

3.5 Compare data/information with performance indicators

3.6 Recommend improvements to reliability strategy in accordance with procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- explaining concepts and processes of chosen proactive maintenance strategy used by the organisation and distinguishing from traditional (breakdown) maintenance strategies
- communicating with operators, other maintenance personnel, team leaders and technical experts in a variety of situations and using different media
- adapting personal communication strategy to different levels of operator and team leader literacy and numeracy
- working in formal and ad-hoc teams to implement proactive maintenance
- solving problems to root cause
- planning proactive maintenance tasks to fit in with maintenance and production schedules and the needs of other staff
- assessing the ability of operations personnel with regard to inspections and servicing of equipment
- reading and interpreting charts and diagrams, manufacturer manuals and specifications and operating procedures

Required knowledge

Required knowledge includes:

- requirements of the proactive maintenance strategy being implemented
- operating principles and procedures for equipment/plant subject to proactive maintenance strategy
- purpose and processes for data collection in proactive maintenance strategies
- procedures relevant to own job and organisation implementation of proactive maintenance

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- methods of making/recommending improvements

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • source information from manuals and other technical documentation or software • effectively communicate with users on equipment operational and maintenance history • develop schedules for maintenance activities including seeking technical assistance, where appropriate • differentiate between proactive and traditional maintenance strategies.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation

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	• case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and

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	analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • OEE • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise, the work organisation, culture • regulatory environment and the industry sector
TPM	TPM is an application of total quality management to maintenance with the intention of increasing reliability, getting it right first time and increasing OEE
RCM	RCM moves maintenance from reactive, or even planned/programmed, towards a focus on uptime and OEE
Similar strategies	Similar strategies may include: • mean time between failure (MTBF) which is one key measure of the effectiveness of a maintenance procedure, and is an indicator as to whether root causes are being found and resolved. If MTBF is reducing, then it is an indicator that the maintenance regime is failing • failure mode and effects analysis (FMEA) which is a systematic approach that identifies potential failure modes in a system, product, or equipment based operations caused by either design or operation/process deficiencies. It also identifies critical or significant design or process characteristics that require special controls to prevent or detect failure modes. FMEA is a tool used to prevent problems from occurring • industry sectors have highly adapted forms of FMEA

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	and which may practice traditional FMEA in say their routine maintenance while using another technique, such as Hazard and Operability Studies (HAZOP) for design and modification. HAZOP is a form of FMEA which has been practiced by the process industries for over 30 years and examines the implications of changes in process conditions to process stability • condition monitoring which often involves quite sophisticated monitoring of equipment, including such things as vibration monitoring, instrumental analysis of lubricating oil, and so on, to determine the current state of the equipment, monitor the change in this condition and predict when it needs servicing/maintenance to maintain reliability.
OEE	OEE is the combination of the main factors causing loss of productive capacity from equipment/plant and is: *OEE = availability x performance x quality rate* where: • availability takes into account losses due to breakdown, set-up and adjustments • performance takes into account losses due to minor stoppages, reduced speed and idling • quality rate takes into account the losses due to rejects, reworks and start-up waste
Uptime	Uptime refers to the overall availability of the plant (it is the inverse of downtime) or the unavailability of the plant. Ideal uptime is 100%
Inspection	Inspection may include: • reading dials, gauges and meters • observations, including those using sight, hearing, smell and feel • observations of product quality/faults/rejects
Servicing	Servicing may include: • cleaning • lubricating • topping up • adjusting
Procedures	Procedures may include: • work instructions • standard operating procedures

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	• formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations Procedures may be: • written, verbal, computer based or in some other format

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS404083A Support proactive maintenance

Modification History

New unit, superseding MSACMT483A Support proactive maintenance - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to lead a production team/work group or maintenance team in a proactive maintenance environment.

Application of the Unit

This unit applies in a competitive systems and practices organisation where proactive maintenance strategies, such as total preventative/productive maintenance (TPM) or reliability centred maintenance (RCM) are used. This unit applies to a team leader or other person who as part of their role assists others in implementing and following the proactive maintenance practices. Team refers to formally designated teams or a group of employees in a common work area.

The unit assumes that team members and in particular the team leader or other support person are in possession of technical knowledge appropriate to their position about the organisation's operational processes and equipment and are able to apply this to the maintenance strategy.

The unit covers the leading of a team in proactive maintenance activities, such as keeping records, visual checks, analysis of failures and effects on production and housekeeping. The unit does not cover breakdown maintenance, condition monitoring or non-destructive testing (NDT).

This unit requires the application of skills associated with communication, teamwork, problem solving, initiative, enterprise, planning and organising in order to lead a team in the development and implementation of proactive maintenance strategies. This unit has a strong emphasis on developing and resourcing the team to interpret information and monitor equipment and operation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Lead team in monitoring process and equipment	1.1	Demonstrate to team how to observe the process/equipment continuously and critically using appropriate senses (e.g. sight and hearing) to identify any potential or actual problems
		1.2	Identify to team data indicators that must be monitored and recorded
		1.3	Ensure team monitors identified data indicators frequently and critically
		1.4	Ensure symptoms of operations outside the desired range of conditions and performance are recognised
		1.5	Analyse cause of equipment non-standard performance within scope of knowledge and skill
		1.6	Ensure team members take timely and appropriate action to solve problems or to refer problems to appropriate manager or specialist
2	Apply proactive maintenance strategy	2.1	Obtain and discuss maintenance strategy with relevant people
		2.2	Identify aspects of maintenance strategy which require specific input from team

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		2.3	Discuss maintenance strategy with team members
		2.4	Ensure team members have resources and training to be able to make the required contributions
3	Analyse standard procedures and work practices	3.1	Examine team procedures and practices for compatibility with maintenance strategy
		3.2	Identify areas where production procedures/practices should be changed to comply with maintenance strategy
		3.3	Identify areas where maintenance strategy should change to comply with production procedures and practices
		3.4	Identify other activities or areas where changes might increase equipment reliability
		3.5	Take appropriate action to have the required changes made
4	Facilitate team contribution to proactive maintenance	4.1	Monitor team's contribution to proactive maintenance
		4.2	Arrange for competency development of team members, as required
		4.3	Facilitate ongoing examination by the team of process reliability and overall equipment effectiveness (OEE)
		4.4	Arrange for follow through and implementation of team originated improvements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- explaining concepts and processes to team of the proactive maintenance strategy and associated analyses used by the organisation and distinguishing from traditional (breakdown)

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maintenance strategies
- communicating with team members, maintenance personnel and technical experts in a variety of situations and using different media
- assessing capability of team as a whole and individually to contribute to proactive maintenance strategy
- identifying resources in the organisation to improve team capability in regards to proactive maintenance strategy
- working in a team
- solving problems

Required knowledge

Required knowledge includes:

- the production process as it applies to the team area of responsibility
- equipment controls and function used in team's work area
- data ranges and indicators for normal team operations
- data and equipment variations and fault indicators able to be identified by team during operations
- proactive maintenance strategies used by the organisation, including:
  - range of date required from team for proactive maintenance strategy
  - typical analyses used by the proactive maintenance strategy and their implication for work of the team
  - responsibilities of the team, maintenance staff and technical experts
- OEE and relationship to team's operational capability

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • communicate effectively with team on the proactive maintenance strategy being adopted and the role expected by the team in its implementation • identify data required from team and for team key from the proactive maintenance strategy • analysing proactive maintenance strategy and current work practices of the team to identifying opportunities for better fit

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	• differentiate between proactive and traditional maintenance strategies.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP), and proprietary systems statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • OEE • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector

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Team	Team may include: • work teams from all sections of the organisation including production, maintenance, technical, administration/finance and sales/marketing • a formally designated team or a group of employees in a common work area
Proactive maintenance strategies and associated analyses	Proactive maintenance strategy and associated analyses may include: • TPM and RCM • root cause analysis (RCA) • mean time between failures (MTBF) • failure mode and effects analysis (FMEA) • condition monitoring
TPM	TPM is an application of total quality management to maintenance with the intention of increasing reliability, getting it right first time and increasing OEE
RCM	RCM moves maintenance from reactive, or even planned/programmed, towards a focus on uptime and OEE
OEE	OEE is the combination of the main factors causing loss of productive capacity from equipment/plant and is: *OEE = availability x performance x quality rate* where: • availability takes into account losses due to breakdown, set-up and adjustments • performance takes into account losses due to minor stoppages, reduced speed and idling • quality rate takes into account the losses due to rejects, reworks and start-up waste
MTBF	MTBF is one key measure of the effectiveness of a maintenance procedure, and is an indicator as to whether root causes are being found and resolved. If MTBF is reducing, then it is an indicator that the maintenance regime is failing
FMEA	FMEA is a systematic approach that identifies potential failure modes in a system, product, or operations/assembly operation caused by either design or operations/assembly process deficiencies. It also identifies critical or significant design or process characteristics that require special controls to prevent or

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	detect failure modes. FMEA is a tool used to prevent problems from occurring. Some industry sectors have highly adapted forms of FMEA and may practice traditional FMEA in say their routine maintenance while using another technique, such as Hazard and Operability Studies (HAZOP) for design and modification. HAZOP is a form of FMEA which has been practiced by the process industries for over 30 years and examines the implications of changes in process conditions to process stability.
Condition monitoring	Condition monitoring often involves quite sophisticated monitoring of equipment, including such things as: • vibration monitoring • instrumental analysis of lubricating oil, and so on, to determine the current state of the equipment, monitor the change in this condition, and predict when it needs servicing/maintenance to maintain reliability For this unit an awareness level only of condition monitoring and its implications for team operations is required.

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405001A Develop competitive systems and practices for an organisation

Modification History

New unit, superseding MSACMS600A Develop a competitive manufacturing system - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to develop new strategies for competitive systems and practices or make improvements to existing systems and practices.

Application of the Unit

This unit applies to a manager, technical specialist or similar in an organisation implementing competitive systems and practices, or in an organisation wishing to embark on the competitive systems and practices path. The person needs to be able to analyse the needs of the organisation and develop strategies and systems for effective implementation and continuous improvement of competitive systems and practices in the organisation.

This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information and consulting with stakeholders. Problem solving, initiative and enterprise, and planning and organising are required to determine effective competitive systems and practices strategies for the organisation. This unit also requires aspects of self-management and learning to ensure feedback and new learning is integrated into competitive systems and practices strategies.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Determine appropriate analytical techniques	1.1	Liaise with key stakeholders to determine objectives of operations strategy
		1.2	Examine current operations to determine major areas requiring improvement
		1.3	Compare possible strategies, techniques and tools against organisation needs
		1.4	Select possible strategies, techniques and tools
		1.5	Consult with key stakeholders to confirm selected strategies, techniques and tools
2	Develop competitive systems and practices strategies	2.1	Estimate benefit/cost ratio for major stakeholders and the value stream overall
		2.2	Determine preferred operations strategy
		2.3	Examine and adapt strategy to organisation needs and priorities
		2.4	Examine and adapt competitive systems and practices techniques and tools required to implement strategy
		2.5	Negotiate with key stakeholders to develop an implementation plan
		2.6	Determine key information and performance indicators required

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3	Implement strategy	3.1	Determine data collection required
		3.2	Identify and evaluate methods of collecting and processing required data
		3.3	Determine hardware and other resources required
		3.4	Evaluate skill needs required
		3.5	Ensure all resources/training are available and completed
		3.6	Implement strategy
4	Monitor implementation of strategy	4.1	Compare information/performance indicators with desired levels
		4.2	Liaise with key stakeholders regarding strategy issues
		4.3	Identify areas requiring adjustment
		4.4	Make required adjustments

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- undertaking self-directed problem solving and decision-making on issues of a broad and/or highly specialised nature and in a wide variety of contexts
- analysing current state/situation of the organisation and value stream, including appropriateness of strategy, operations and internal and external relationships, including value stream members
- determining appropriate key performance indicators (KPIs) and overseeing data collection
- selecting appropriate competitive systems and practices tools and techniques, such as:
  - value stream mapping
  - 5S
  - Just in Time (JIT)
  - mistake proofing
  - process mapping

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  - establishing customer pull
  - kaizen and kaizen blitz
  - setting of KPIs/metrics
  - identification and elimination of waste
- communicating at all levels in the organisation and value stream and to audiences of different levels of literacy and numeracy
- prioritising situations and actions based on:
  - customer benefit
  - cost/benefit analysis
- reviewing and modifying strategies and KPIs, as required

Required knowledge

Required knowledge includes:

- competitive systems and practices principles and tools, including:
  - value stream mapping
  - 5S
  - JIT
  - mistake proofing
  - process mapping
  - establishing customer pull
  - kaizen and kaizen blitz
  - setting of key performance indicators/metrics
  - identification and elimination of waste
- methods of estimating costs/benefits
- acceptable benefit/cost ratios
- continuous improvement principles
- principles of motivation and leadership
- characteristics and strengths of different types of strategies, techniques and tools, such as 5S, JIT, six sigma, lean operations and agile operations
- business goals sufficient to match the strategy to the business needs
- strategic thinking
- principles of process equipment and how to improve its reliability
- resources required and how to obtain them

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

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performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • determine appropriate analytical techniques • develop strategies that deliver the greatest overall benefit • implement the strategies • monitor the implementation of the strategy.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to

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	accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures

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	• current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Competitive systems and practices techniques and tools	Competitive systems and practices techniques and tools may include: • value stream mapping • 5S • JIT • mistake proofing • process mapping • establishing customer pull • kaizen and kaizen blitz • setting of KPIs/metrics • identification and elimination of waste (muda) • standardisation
Value stream	The value stream begins with the customer and includes all actions (both value-adding and non-value added) by both internal sections/departments and external organisations to meet a customer requirement. Depending on the operations and the customer requirement stages where value stream actions may occur include: • sales outlet/representative • information gathering, data analysis and research • product design • raw material sourcing • intermediate processing • final assembler/collation/preparation • support services (e.g. accounting, finance and legal) • storage and delivery to customer • after market support

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Unit Sector(s)

Unit sector	Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405002A Analyse and map a value stream

Modification History

New unit, superseding MSACMS601A Analyse and map a value chain* - Not equivalent

* Prerequisite *MSACMT631A Undertake value analysis of product costs in terms of customer requirements* - removed

Unit Descriptor

This unit of competency covers the skills and knowledge required to analyse and map a value stream, including the clear identification of the place of an organisation in the value stream and its contribution to the value stream. The unit includes the identification of an organisation in a value stream, their relationships and the activities undertaken by value stream organisations. The identification skills include identification at the virtual or information level, the technical or process level, and at the physical or logistic level.

The unit includes the analysis of value-adding and non-value adding activities and the information needs for successful value stream mapping, including information technology (IT) needs.

This unit covers the analysis of the supply chain, the demand chain as well as the overall value stream.

Application of the Unit

This unit applies to a person in a senior role in an organisation, such as an operations manager, purchasing manager, senior technical officer performing planning or scheduling or similar who needs to analyse and map a value stream, a supply chain, or a demand chain in order to understand the interactions between all members and determine the value added/potential value added by each member. The value stream is represented visually according to organisation format requirements.

This information is the basis for the design of Just in Time (JIT) and for the determination of waste. Value stream analysis is not a one-off activity but rather an ongoing activity of re-analysis as the value stream changes and its members progress towards excellence in competitive systems and practices.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Map the value stream	1.1	Select a product/product group for analysis
		1.2	Identify ultimate customer
		1.3	Identify ultimate supplier
		1.4	Identify all organisations between ultimate supplier and ultimate customer
		1.5	Identify all steps in own organisation
		1.6	Map value stream
2	Define customer need	2.1	Determine the features/benefits obtained by customers from product
		2.2	Determine methods of measuring the contribution to each features/benefits
		2.3	Identify possible data sources for required measures
		2.4	Implement measurement of contribution to features/benefits

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3	Assess the value added at each step	3.1	Identify value contributed by each external organisation
		3.2	Determine value added by each internal step
		3.3	Determine method of measuring value added
4	Reduce waste	4.1	Compare value added to customer benefit/feature
		4.2	Identify activities on value stream map which do not add to customer benefit/features
		4.3	Liaise with external value stream members to determine methods to reduce overall waste
		4.4	Take required actions to reduce waste

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying for an individual organisation its place in the value stream, including immediate upstream and downstream organisations
- determining flow of materials and information along the value stream, including:
  - output quantities and qualities
  - variability in quality and quantity
  - uptime
  - other key performance indicators (KPIs) indicators appropriate to the organisation and customer requirements
- classifying steps and processes into value adding and non-value adding, including determining appropriate methods for measuring value added
- mapping value stream showing flow of information and materials in either hard copy or using software
- communicating at all levels in the organisation and value stream and to audiences of different levels of literacy and numeracy

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Required knowledge

Required knowledge includes:

- purpose of value stream analysis
- methods of value stream analysis and mapping
- concept of waste and value in terms of customer benefit
- types of waste and methods of reducing it
- processes, and operations used in own organisation to make products or deliver services to internal and external customers
- processes employed by other members of the value stream sufficient to have meaningful dialogue with them

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to:
	• review activities of organisations to determine:
	  • their place in value stream
	  • value added by each organisation
	  • non-value added steps within each organisation
	• determine methods of measuring value added
	• prepare a map of a value stream that includes all value creating and non value adding steps.

Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers

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	• case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as

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	Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Value stream	The value stream begins with the customer and includes all actions (both value-adding and non-value added) by both internal sections/departments and external organisations to meet a customer requirement. Depending on the operations and the customer requirement stages where value stream actions may occur include: • sales outlet/representative • information gathering, data analysis and research • product design • raw material sourcing • intermediate processing • final assembler/collation/preparation • support services (e.g. accounting, finance and legal)

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	• storage and delivery to customer • after market support
Value-added	Value-added is measured against its contribution to the customer benefits/features and may be in the form of: • technical benefits/features • location benefits/features • aesthetic benefits/features • information benefits/features
Map value stream	The map of the value stream can be completed using: • hard copy (e.g. paper or whiteboard) • appropriate software tools The map should show all participants and stages of materials and information flow and the value creating and non-value adding steps and processes
JIT	JIT refers to: • a production scheduling concept that calls for any item needed at a production operation (whether raw material, finished item, or anything in between) to be produced and available precisely when needed, neither a moment earlier nor a moment later
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Within operations, categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items • activities which do not yield any benefit to the organisation or any benefit to the organisations customers

Unit Sector(s)

Unit sector Competitive systems and practices

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Custom Content Section

Not applicable.

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MSS405003A Manage a value stream

Modification History

New unit, superseding MSACMS602A Manage a value chain* - Not equivalent

* Prerequites MSACMS601A Analyse and map a value chain and MSACMT631A Undertake value analysis of product costs in terms of customer requirements - removed

Unit Descriptor

This unit of competency covers the skills and knowledge required to manage a value stream, a supply chain or a demand chain, including close liaison with suppliers and customers.

This unit covers the managing of the supply chain, the demand chain as well as the overall value stream and may be applied to the managing of the chain internally/externally within an organisation.

Application of the Unit

This unit applies to a person in a senior role in an organisation, such as a manager, technical specialist or similar, who needs to manage the value/supply/demand chain on an ongoing basis to achieve the best overall contribution of valued added to their product in terms of customer benefit/features. The unit can be applied to value streams of large or small organisations and to internal and external value streams or a combination value stream.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Evaluate the value stream	1.1	Identify all members in the value stream for products in area of responsibility
		1.2	Identify value added by each member of the chain
		1.3	Identify non-value adding steps in the value stream
		1.4	Identify acute and chronic issues which impact on the value stream
		1.5	Develop priority list of items for improvement
2	Liaise regularly with chain members	2.1	Establish and maintain regular liaison with all chain members
		2.2	Identify current and forecast issues with each member
		2.3	Work with members to help them address their issues
		2.4	Build trust and confidence in the relationship
		2.5	Develop with each chain member a priority list of items for improvement
		2.6	Negotiate with all chain members to ensure improvements benefit chain members and improve the benefits/features perceived by the ultimate customer
3	Monitor the value added at each step	3.1	Identify changes in value added by each chain member
		3.2	Identify areas where changes to value added are required

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		3.3	Develop a priority list of required value-added changes
		3.4	Work with chain member to bring about improvements to value added
4	Continue to reduce waste	4.1	Identify waste in value stream
		4.2	Work with chain members to continually reduce waste

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- reading and interpreting a value stream map
- identifying, monitoring and managing flow of materials, information and services in the value stream, including:
  - output quantities and qualities
  - variability
  - uptime
  - other key performance indicators (KPIs) indicators appropriate to the value stream organisations and customer benefit/requirements
- communicating and negotiating at all levels in the organisation and value stream and with individuals of different levels of literacy and numeracy
- identifying steps and processes as value adding and non-value adding
- using appropriate methods for measure value added at steps in the value stream

Required knowledge

Required knowledge includes:

- purpose of value stream analysis
- methods of value stream analysis and mapping
- concept of waste and value in terms of customer benefit
- types of waste and methods of reducing it
- processes, and operations used in own organisation to make products or deliver services to internal and external customers

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- processes employed by other members of the value stream sufficient to have meaningful dialogue with them

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • review activities of organisations to determine: • their place in value stream • value added by each organisation • non-value added steps within each organisation • determine priorities for improvement in own organisation • negotiate with value stream members on improvements • monitor improvements to determine value added.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects

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	• suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems

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	• supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Value stream	The value stream begins with the customer and includes all actions (both value-adding and non-value added) by both internal sections/departments and external organisations to meet a customer requirement. Depending on the operations and the customer requirement stages where value stream actions may occur include: • sales outlet/representative • information gathering, data analysis and research • product design • raw material sourcing • intermediate processing • final assembler/collation/preparation • support services (e.g. accounting, finance and legal) • storage and delivery to customer • after market support
Value added	Value added is measured against its contribution to the customer benefits/features and may be in the form of: • technical benefits/features • location benefits/features • aesthetic benefits/features

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	• information benefits/features
Value stream map	The map of the value stream may include: • hard copy (e.g. paper or whiteboard) • using appropriate software The map should show all participants and stages of materials and information flow and the value creating and non-value adding steps and processes
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Within operations, categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items • activities which do not yield any benefit to the organisation or any benefit to the organisation's customers

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405004A Develop business plans in an organisation implementing competitive systems and practices

Modification History

New unit, superseding MSACMS603A Develop manufacturing related business plans - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to develop business plans in an organisation implementing competitive systems and practices.

Application of the Unit

This unit applies to a person in an organisation implementing competitive systems and practices (e.g. a production/plant manager, purchasing/technical officer or similar) who is required to develop a section business plan to meet the requirements of the overall strategic plan of the organisation. The plan includes the impact on the value stream and other critical competitive systems and practices factors. Due to competitive pressures this may be a reasonably frequent activity and can occur at any time over the business cycle. The plan may be in response to a specific change, or it may be a plan for the next period.

This unit assumes that up-to-date information about the organisation's role in the value stream is available. For detailed mapping and analysis of the value stream refer to MSS405002A Analyse and map a value stream.

This unit primarily requires the application of skills associated with gathering, analysing and applying information and consulting with stakeholders. Problem solving, initiative and enterprise, and planning and organising are required to develop an effective and measurable business plan. This unit also requires aspects of self-management and learning to ensure feedback and new learning is integrated into competitive systems and practices strategies.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Determine purpose of plan	1.1	Confirm reason for developing plan and expected outcomes from plan
		1.2	Confirm purpose of plan with all relevant stakeholders
		1.3	Check expected outcomes from plan with overall strategic plan for organisation
		1.4	Identify any potential areas for conflict between proposed plan and strategic directions
		1.5	Negotiate with relevant stakeholders to resolve issues
2	Develop objectives and strategies	2.1	Draft objectives for business plan
		2.2	Draft strategies to achieve these objectives
		2.3	Determine implications for value stream
		2.4	Determine capital or workplace layout/organisation implications for objectives and strategies
3	Develop plans to meet objectives	3.1	Negotiate with relevant stakeholders over implications for objectives and strategies

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	and strategies	3.2	In liaison with relevant stakeholders, develop plans to meet objectives
		3.3	Determine relevant key performance indicators (KPIs) for plan
		3.4	Check KPIs are appropriate for purpose of plan
		3.5	Check plan will deliver planned purpose
		3.6	Map plan to changed value stream
		3.7	Adjust plan to optimise value stream
		3.8	Validate plan with relevant stakeholders
4	Monitor the implementation of the plan	4.1	Release plan for implementation
		4.2	Check the key progress points against the key stages of the plan
		4.3	Note any discrepancies
		4.4	Take appropriate action to ensure correct implementation of plan

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating at all levels in the organisation and value stream and to audiences of different levels of literacy and numeracy
- undertaking self-directed problem solving and decision-making on issues of a broad and/or highly specialised nature and in a wide variety of contexts
- analysing organisation overall strategic plan for implications relevant to competitive systems and practices implementation
- determining appropriate KPIs and methods of data collection
- determining best means of gathering data, including data from monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary

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systems
- identifying value stream members and performance
- determining implications of business plan for value stream
- analysing data, including competitive systems and practices indicators and verifying results with stakeholders
- determining key parameters for business plan, including:
  - scope
  - period
  - objectives in terms of customer benefit
  - relationship to overall organisation objectives
  - targets
  - KPIs
  - implementation strategy
  - risk management
  - monitoring and adjustment strategy
  - approval process

Required knowledge

Required knowledge includes:

- organisation strategic directions
- business planning methods and types of plans
- contingency planning and other risk mitigating planning tools
- the organisation's value stream
- analysis of value stream
- competitive systems and practices
- application of quality principles
- human resources and industrial relations
- occupational health and safety (OHS)

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • develop a business plan that conforms to organisation

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	overall strategic directions • determine implications of business plan for competitive systems and practices practice in organisation • determine KPIs appropriate for business plan • monitor the implementation of a business plan and make adjustments as necessary.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.

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Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as SCADA software, ERP systems, MRP and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account:

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	• the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Plan	Plan may include: • any sort of business plan and may emphasise any of the areas for sub-plans over the others
Objectives	Objectives may include performance in terms of: • sales • profit • quality • OHS • environment • competitive systems and practices • human, physical, financial and environmental/resource use
Objectives and strategies	Objectives and strategies may include: • human and industrial relations practice • material/component and resources use • sustainable environmental practices • sales and marketing • financial • regulatory compliance
Relevant stakeholders	Relevant stakeholders may include: • other team members • other workers • management • technical specialists • other members of the value stream
Value stream	The value stream begins with the customer and includes all actions (both value adding and non value added) by both internal sections/departments and external organisations to meet a customer requirement. Depending on the operations and the customer requirement stages where value stream actions may occur include: • sales outlet/representative • information gathering, data analysis and research

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	• product design • raw material sourcing • intermediate processing • final assembler/ collation/preparation • support services (e.g. accounting, finance and legal) • storage and delivery to customer • after market support

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405005A Manage competitive systems and practices responding to individual and unique customer orders

Modification History

New unit, superseding MSACMS604A Manage competitive manufacturing processes in a jobbing shop environment* - Not equivalent

* Prerequisites *MSACMS601A Analyse and map a value chain, MSACMT280A Undertake root cause analysis, MSACMT631A Undertake value analysis of product costs in terms of customer requirements* - removed

Unit Descriptor

This unit of competency covers the skills and knowledge required to prepare for and manage the introduction of competitive systems and practices processes in an organisation that does not undertake repetitive processes or mass produce products and instead responds to individual and unique customer orders.

Application of the Unit

This unit applies to the introduction of competitive systems and practices processes in an environment where the organisation or part of the organisation specialises in one-off or small batch product or operations driven by individual and unique customer orders (e.g. overhaul of equipment, jobbing manufacture, supply of customised/bespoke services or product).

This unit describes the skills needed to restructure the process and work organisation to allow the application of competitive systems and practices tools and techniques.

This unit requires the application of skills associated with problem solving, initiative, enterprise, planning and organising in order to manage competitive systems and practices processes in a jobbing shop environment. This unit also requires communication and teamwork skills to gather information about processes and implement redesign plans.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Analyse the existing operations	1.1	Identify organisation capability for products and processes
		1.2	Identify the major processing steps in meeting customer order or orders
		1.3	Consult with employees, managers and other major stakeholders on major expected benefits from a move to a competitive systems and practices strategy
		1.4	Identify lead times, throughput times and waiting times throughout process of meeting a customer order
		1.5	Identify variations within the process
		1.6	Identify causes of the variations
2	Draft a virtual flow process	2.1	Consider similarities in materials, processes and services for orders
		2.2	Map flow of information, material, processes and people for each product family/cluster of similar customised products/services
		2.3	Draw a current state value stream map for the process as a virtual flow process

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		2.4	Analyse the current value stream map for waste
		2.5	Draft possible future state value stream map
		2.6	Calculate benefits flowing from future state map
		2.7	Consult with stakeholders to validate benefits
3	Prepare proposals for process redesign	3.1	Identify options for the delivery of competitive systems and practices and other changes required to move to future state value stream map
		3.2	Plan as to how these changes might be implemented
		3.3	Cost the proposed changes and determine benefit/cost ratios
		3.4	Prepare recommendations for change
		3.5	Negotiate/consult with relevant stakeholders to establish the preferred option
4	Implement the plan	4.1	Arrange for altered process, as required
		4.2	Arrange for altered infrastructure needs, as required
		4.3	Monitor the implementation of the plan, making adjustments as required
		4.4	Review the new value stream and check that expected benefits have been obtained
		4.5	Put in place a continuous improvement mechanism for the new value stream

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

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- identifying and draw current state maps for jobs/processes
- analysing current targets for jobs (e.g. quality, time and cost) and identifying variations from targets
- analysing current processes used in the organisation, including appropriateness of strategy, operations, and internal and external relationships, including value stream members
- identifying waste
- proposing changes and determine cost/benefit of each change
- selecting and adapting appropriate competitive systems and practices tools and techniques for a jobbing environment, such as:
  - value stream mapping
  - 5S
  - Just in Time (JIT)
  - mistake proofing
  - process mapping
  - kaizen and kaizen blitz
  - setting of key performance indicators(KPIs)/metrics
  - identification and elimination of waste
- communicating at all levels in the organisation and value stream and to audiences of different levels of literacy and numeracy
- developing future state maps

Required knowledge

Required knowledge includes:

- competitive systems and practices principles and tools, including:
  - value stream mapping
  - 5S
  - JIT
  - mistake proofing
  - process mapping
  - kaizen and kaizen blitz
  - setting of KPIs/metrics
  - identification and elimination of waste
  - establishing customer pull
  - standardisation
- processes used in jobbing manufacture and other non-repetitive operations businesses
- capabilities of equipment
- methods of estimating costs/benefits
- acceptable benefit/cost ratios
- continuous improvement principles

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- abilities and skills of personnel in organisation

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • analyse existing operations and draft virtual flow process • determine improvements that deliver the greatest overall benefit • plan the implementation of competitive systems and practices strategy, techniques and tools • produce a current state value stream map • draft possible future state value stream map • monitor a continuous improvement strategy.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation

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	• case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and

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	analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Variations	Variations are deviations from desired targets and may cover variations in: • quality • time • cost • occupational health and safety (OHS)
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit or features in the product. Within operations, categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items • activities which do not yield any benefit to the organisation or any benefit to the organisations customers
Stakeholders	Stakeholders may include: • managers

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	• supervisors • employees • shareholders • OHS mechanisms/representatives • Industrial relations mechanisms/representatives • suppliers • customers • service providers
Infrastructure needs	Infrastructure needs may include: • physical infrastructure, including plant, equipment, tools, systems and processes • information and control infrastructure • work organisation, including numbers of employees • work structure and skills and knowledge held by employees • workforce development and, where required, training
Value stream	The value stream begins with the customer and includes all actions (both value adding and non value added) by both internal sections/departments and external organisations to meet a customer requirement. Depending on the operations and the customer requirement stages where value stream actions may occur include: • sales outlet/representative • information gathering, data analysis and research • product design • raw material sourcing • intermediate processing • final assembler/ collation/preparation • support (services e.g. accounting, finance and legal) • storage and delivery to customer • after market support

Unit Sector(s)

Unit sector Competitive systems and practices

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Custom Content Section

Not applicable.

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MSS405010A Manage relationships with non-customer external organisations

Modification History

New unit, superseding MSACMS606A Manage relationships with non-customer external organisations - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to identify and manage relationships with non-customer external organisations, such as community groups, other businesses, training providers, research organisations and government departments.

Application of the Unit

This unit applies to a person who has policy responsibility in an organisation for managing external relationships that may impact on the performance, community standing or regulatory compliance of the organisation. Examples of the application of this unit include department leaders, managers or similar. The unit covers managing a range of external organisations to the maximum benefit of the organisation and the organisation's customers while also identifying areas of mutual interest and benefit with the external organisations. Relationships may or may not be initiated by the person’s own organisation.

This unit does not cover the analysis and improvement of relationships between members of a value stream, such as suppliers and customers.

This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information and consulting with stakeholders. Problem solving, initiative and enterprise, and planning and organising are also required. This unit also requires aspects of self-management and learning to ensure feedback and new learning is integrated into relationship systems and expectations.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Identify mutual interest	1.1	Clarify the reason contact was/is to be made for each relevant external organisation
		1.2	Gather information on extent of past contact and any positive or negative outcomes for own and external organisation
		1.3	Identify expectations of initiating organisation
		1.4	Analyse the breadth, depth and complexity of external organisations' expectations
		1.5	Discuss expectations, ability to meet those expectations, and areas of mutual interest with relevant internal and external representatives
2	Determine contribution of relationship	2.1	Identify any value contributions from relationship
		2.2	Identify waste arising from relationship
		2.3	Classify waste as necessary or unnecessary
		2.4	Set key performance indicators (KPIs) for future relationship
3	Manage the	3.1	Measure current performance of relationship against

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relationship		expectations and KPIs
	3.2	Develop systems to enhance mutual benefit and value contributions from relationship
	3.3	Develop systems to minimise and control necessary waste without causing harm
	3.4	Eliminate unnecessary waste, where possible, without causing harm
	3.5	Monitor KPIs and determine future strategy for the relationship
	3.6	Continue to manage terminate the relationship in a manner which enhances the organisation

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- using formal problem solving procedures, such as root cause analysis (RCA)
- analysing contributions to value from external relationships
- identifying waste (muda)
- developing formal and informal communication procedures with other individuals and organisations
- establishing sources of assistance in own organisation for external individuals and organisations
- interpreting documents, procedures and instructions for others
- establishing KPIs for relationships

Required knowledge

Required knowledge includes:

- strategic requirements of own organisation
- strategic benefits to the organisation from liaisons with external organisations
- possible external organisations which may offer benefits
- benefits which can be offered to the external organisations
- customer benefits/features from products and processes of own organisation

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- waste (muda) elimination
- formal problem solving procedures (e.g. RCA)

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • analyse the value and waste in relationships • implement changes to relationships to improve outcomes for their organisation and its customers • monitor outcomes of a relationship against KPIs • communicate complex information to external representatives using a variety of methods and mediums.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace that is engaging with one or more non-customer external organisations. Access may be required to: • historical information on the relationship with external organisation and the involvement of the assessee • workplace procedures and plans • specifications and documentation relating to planned, currently being implemented, or implemented changes to relationships with non-customer external organisations • reports from supervisors/managers on interaction with external non-customer organisations • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation

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	• case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and

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	analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Reasons for contact	Reasons for contact may include: • research • innovation • mutual cooperation • strategic alliances • computer (or other) technology • emergency response
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items • activities which do not yield any benefit to the organisation or any benefit to the organisation's customers

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Necessary waste	Necessary waste includes: • any activity or cost which does not contribute directly to customer benefit/feature in the product, and which cannot be avoided (e.g. regulatory compliance and fixed costs) Necessary waste cannot be eliminated but should be managed
Unnecessary waste	Unnecessary waste includes: • any activity or cost which does not contribute directly to customer benefit/features in the product and can be avoided Unnecessary waste should be eliminated as quickly as practical

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405011A Manage people relationships

Modification History

New unit, superseding MSACMC611A Manage people relationships - Not equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to manage the human relationship aspects of implementing and operating competitive systems and practices.

Application of the Unit

This unit applies to a person (who may be a manager, technical specialist or other person) who is required to work with employees and relevant people, encourage them to accept change and also to increase the quality, quantity and reliability of output consistent with customer requirements.

This unit primarily requires strong communication, teamwork and problem solving skills to achieve effective relationships that support a competitive systems and practices environment. Initiative, enterprise, planning and organising are also required to ensure relationships are monitored and issues are resolved proactively. The unit also includes aspects of self-management and learning to ensure improvement of own performance and communication skills.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised

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unit of competency.	text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Confirm organisation competitive systems and practices status	1.1	Establish number and status of competitive systems and practices techniques being used within the organisation
		1.2	Identify key performance indicators (KPIs) for each technique
		1.3	Identify key sections and value stream members responsible for each KPI
		1.4	Identify key personnel for communications
2	Develop an open environment	2.1	Establish and maintain regular dialogue between all levels and all relevant sections of the organisation
		2.2	Encourage a flow of communications in both directions
		2.3	Develop and maintain a formal mechanism for the flow of issues, concerns and suggestions in both directions
		2.4	Develop and maintain regular and frequent communication with all key stakeholders
3	Identify significant issues	3.1	In liaison with relevant team members/stakeholders, identify current and potential issues
		3.2	Assist team members/stakeholders to formulate issues
		3.3	Identify and define boundary and non-negotiable issues for all team members/stakeholders
		3.4	Negotiate with relevant team members/stakeholders over actual and potential issues

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4	Proactively resolve issues	4.1	Liaise with team members/stakeholders to develop agreed, and where possible, win-win solutions
		4.2	Negotiate acceptable solutions, as required, in accordance with company practices/procedures
		4.3	Obtain any required official authorisations
		4.4	Consult with relevant stakeholders to develop implementation plan
		4.5	Implement solution
5	Monitor ongoing situation	5.1	Determine relevant KPIs for plan
		5.2	Check that implementation is proceeding to plan
		5.3	Check for unforeseen consequences
		5.4	Take appropriate action to resolve any arising issues

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- analysing the competitive operational techniques being implemented in the organisation and the stage of implementation, including identifying people, related needs and issues
- using formal problem solving procedures, such as root cause analysis (RCA)
- analysing work procedures
- developing formal and informal communication procedures with others in work area, team leaders and other employees relevant to competitive systems and practices changes
- establishing sources of assistance in the organisation for people experiencing difficulty with competitive systems and practices changes
- interpreting procedures and instructions relevant to own expertise for others
- establishing KPIs for own work

Required knowledge

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Required knowledge includes:

- features and benefits of common competitive operational practices, including:
  - Just in Time (JIT) and kanban systems
  - preventative maintenance
  - 5S housekeeping
  - continuous improvement processes (kaizen)
  - waste (muda) elimination
  - formal problem solving procedures (e.g. RCA)
  - standardised work
- health, safety and environment (HSE) principles and requirements for organisation
- change implementation contacts and procedures for the organisation
- employee assistance mechanisms in the organisation
- current processes and principles of operation sufficient to enable communication with others on the impact of competitive operational changes
- sources of data on the process/plant and possible applications to information distribution
- methods of determining own skill needs and developing skills, if required

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the processes used and scope of products/ services supplied by the organisation and the deliverables expected by customers • relate processes and products/services to the competitive systems and practices implementation process and the stage of implementation • communicate and gain support for changes made as a result of the implementation of the competitive systems and practices implementation • develop formal and informal channels of communication, including feedback mechanisms • proactively resolve issues and problems raised by people with the competitive systems and practices implementation process.
Context of and specific resources	Assessment of performance must be undertaken in a

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for assessment	workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Key personnel	Key personnel for communication include:

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	• formally identified managers, supervisors and workforce delegates as well as key opinion shapers (e.g. employees with specialist technical knowledge) on the issue being communicated
Formal mechanisms	Formal mechanisms for communication will vary according to the organisation but may include: • noticeboards • employee circulars • consultative committees • staff associations • union representatives • team leaders
Stakeholders	Stakeholders may include: • team members • personnel officers • industrial officers • union delegates • production management • human relations management • financial management • engineering/technical personnel

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405012A Manage workplace learning

Modification History

New unit, superseding MSACMC612A Manage workplace learning - Not equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to manage the learning and skill development for employees within an organisation implementing competitive systems and practices.

Application of the Unit

This unit applies to a person responsible for management of the identification of skills needed by employees to undertake required work in implementing competitive systems and practices, including arranging for any required learning processes. The unit does not cover trainer and assessor skills.

This unit primarily requires the application of skills associated with communication, teamwork, problem solving, initiative and enterprise in order to assess and address skill needs in an individual and in the organisation. Planning and organising is required to ensure skill development meets the needs of the organisation and aspects of self-management and learning are required to ensure improvement of performance.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised

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unit of competency.	text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Determine current skill requirements for employees	1.1	Establish range and stage of implementation of competitive systems and practices techniques in the organisation
		1.2	Consult with relevant stakeholders on skill requirements for effective implementation of competitive systems and practices techniques used in the organisation
		1.3	Ensure records/database of skill mix currently required by employees are maintained in accordance with procedures
		1.4	Re-assess and monitor the skills required by employees as organisation requirements change
		1.5	Consult with relevant stakeholders to predict any new/different skill requirements arising from changes to products, processes, equipment or work organisation
2	Determine current skill mix of employees	2.1	Ensure current records/database of skill profile of individuals are maintained
		2.2	Consult with relevant stakeholders and monitor the application of these skills in the workplace to ensure they remain current and valid
		2.3	Review the actual skill mix of employees compared to the required skill mix
3	Make arrangements for skill development	3.1	Consult with employees and identify any mismatch of skills possessed and used and skills required
		3.2	Identify any new skills required due to anticipated changes

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		3.3	Consult with relevant stakeholders to determine the best way to refresh existing skills/develop new skills
		3.4	Develop individual skill development program
		3.5	Ensure skill development arrangements are implemented in accordance with procedures
4	Forecast possible future skill needs	4.1	Examine strategic directions of organisation
		4.2	Discuss possible future directions with relevant stakeholders
		4.3	Determine possible long-term future skill requirements in consultation with relevant stakeholders
		4.4	Develop plan to ensure skills are developed in advance of when they are required

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- analysing the competitive operational techniques being implemented in the organisation and the stage of implementation, including establishing skill needs to support implementation
- using formal problem solving procedures, such as root cause analysis (RCA)
- analysing work procedures
- developing formal and informal communication procedures with others in work area, team leaders and other employees relevant to competitive systems and practices changes
- establishing sources of assistance in the organisation for people experiencing difficulty with competitive systems and practices changes
- interpreting procedures and instructions relevant to own expertise for others
- establishing key performance indicators (KPIs) for own work

Required knowledge

Required knowledge includes:

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- features and benefits of common competitive operational practices, including:
  - Just in Time (JIT) and kanban systems
  - preventative maintenance
  - 5S housekeeping
  - continuous improvement processes (kaizen)
  - waste (muda) elimination
  - formal problem solving procedures (e.g. RCA)
  - standardised work
- skill analysis methods or how to access skill analysis from relevant experts
- skill development methods or how to access skill development programs from relevant experts
- electronic and other systems to record and maintain training and skills records
- formal qualifications and skill standards relevant to competitive systems and practices and the processes and products of the organisation
- current processes and principles of operation sufficient to enable communication with others on the impact of competitive operational changes
- sources of data on the processes and/or products of the organisation and implications for workplace learning
- methods of determining own skill needs and developing skills, if required

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify the processes used and scope of products/ services supplied by the organisation and the deliverables expected by customers • relate processes and products/services to the competitive systems and practices implementation process and the stage of implementation • establish skill needs from processes/products and competitive implementation process in the organisation • use formal and informal channels of communication, including feedback mechanisms to assist in identification of skill needs • manage delivery and recording of training to ensure

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	required skills are gained by employees.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to past and current skill development for employees • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Stakeholders	Stakeholders may include:

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	• team members • personnel officers • industrial officers • union delegates • production management • human relations management • financial management • engineering/technical personnel
Skill development arrangements	Skill development arrangements include: • formal vocational and education delivery by a registered training provider (RTO) • education and training delivery by a higher education provider • non-accredited on and off the job training by the organisation, equipment suppliers, industry associations, and so on • coaching and mentoring • self-directed learning • arrangements for recording skills gained by employees
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the processes in an organisation • good operating practice as may be defined by industry codes of practice (e.g. Good manufacturing practice (GMP) and responsible care) • government regulations • industrial relations requirements and any classification changes that result from the acquisition of higher level skills Procedures may be: • written, verbal, computer-based or in some other format

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Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405020A Develop quick changeover procedures

Modification History

New unit, superseding MSACMT620A Develop quick changeover procedures - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to develop/improve changeovers for equipment, processes or operations. It includes critically analysing existing changeovers, applying quick changeover principles, and developing improved changeover procedures.

Application of the Unit

This unit applies to managers, technical specialists or similar in an organisation that has adopted or is adopting a quick changeover approach to its changeovers. The changeovers may be to equipment, processes or operations. This unit applies to the structured development and/or improvement of the changeover procedures.

This unit requires the application of skills associated with communication, problem solving, initiative, enterprise, planning and organising in order to analyse and determine changeover procedures. This unit also requires aspects of self-management and learning to ensure feedback and new learning is integrated into the development of procedures.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised

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unit of competency.	text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Analyse changeover	1.1	Critically observe changeover process
		1.2	Identify steps in changeover
		1.3	Identify start situation and required finish situation for changeover
2	Apply quick changeover principles	2.1	Identify changes to the start situation and required finish situation which are possible
		2.2	Identify internal and external changeover activities
		2.3	Identify activities which could be improved/eliminated
		2.4	Eliminate/reduce adjustments required after changeover
		2.5	Develop improved changeover process and recommendations for implementation procedure
		2.6	Liaise with relevant people to validate recommendations
3	Assess and minimise risks in changeover	3.1	Analyse hazards and risks from all steps in changeover
		3.2	Apply ergonomic principles and hierarchy of control to each equipment and manual hazard
		3.3	Assess any regulatory risk in changeover
		3.4	Minimise hazards during changeover ensuring final risk profile is acceptable
4	Implement	4.1	Acquire any required resources and approvals

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improved changeover	4.2	Organise trials of improved changeover
	4.3	Monitor trial
	4.4	Make adjustments to changeover process
	4.5	Implement improved changeover process

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- critically analysing an existing changeover, including a detailed examination of all actions and delays and the times taken
- determining key steps in changeover
- identifying regulatory implications and other risks changes to procedures
- differentiating between habitual practice and necessary activity
- identifying opportunities to maximise external set up work
- communicating with others to explain and supervise changed procedures

Required knowledge

Required knowledge includes:

- principles of quick changeover
- equipment and operating environment of activities subject to quick changeover
- regulatory and commercial obligations and risk environment for operations subject to quick changeover analysis
- safe movement and other relevant occupational health and safety (OHS) principles
- relevant procedures
- purposes/requirements of changeover
- sourcing of resources
- trialling procedures

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • observe and analyse steps in an existing changeover • manage risks in adjusting changeover procedures • develop changeover adjustments that deliver the greatest overall benefit • supervise changeover procedure trials.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenario, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess

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	underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping

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	• problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Changeover	Changeover may refer to: • equipment exchanges, such as an exchange of dies/tools (traditional) • change between batches • change between campaigns (process manufacturing) • quantum equipment/process change to produce a different product
Quick changeover	Quick changeovers may be known by a number of alternative titles depending on the industry sector. In manufacturing quick changeovers may be referred to as: • single minute exchange of die (SMED) • single-digit set-up – performing a set-up activity in a single-digit number of minutes (i.e. fewer than ten) • one touch exchange of die (OTED) – literally, changing a die with one physical motion, such as pushing a button – broadly, an extremely simple procedure for performing a set-up activity While the term die is the traditional term, organisations that require changeovers using other equipment are also covered by this unit. This unit may not be applicable to a totally continuous operation producing only the one product, or simultaneous range of products. This is not applicable to a maintenance/pressure vessel inspection (PVI) shutdown as experienced by the continuous process manufacturers. However, where there are continuous operations on a campaign basis, it may be applied to the development of changeover procedures between campaigns or similar changeovers
Set-up work	Set-up time is the work required to change over a machine or process from one item or operation to the

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	next item or operation. It can be divided into two types: • internal set-up work that can be done only when the machine or process is not actively engaged • external set-up work that can be done concurrently with the machine or process performing productive duties
Principles	The principles of quick changeover include: • the principles of efficient movement as well as an understanding of equipment features and aids, including jigs, fixtures, locating devices and mechanical aids which will reduce human effort and time required
Improved/eliminated	Activities which should be improved/eliminated include: • those which take time or are unreliable in terms of outcome • those which are difficult to do or have adverse OHS implications (e.g. repetitive strain injury, back injury and finger injuries)
Hazards and risks	Hazards and risks include those related to: • OHS • regulatory compliance • environment • commercial and contractual obligations An acceptable risk profile for changeovers is one which, at the minimum, meets regulatory and organisation requirements and does not increase the current risk profile
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plan • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations Procedures may be: • written, verbal, computer-based or in some other

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	format

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405021A Develop a Just in Time system

Modification History

New unit, superseding MSACMT621A Develop a Just in Time (JIT) system* - Not equivalent

* Prerequisite MSACMC410A Lead change in a manufacturing environment - removed

Unit Descriptor

Not applicable.

Application of the Unit

This unit applies to a person responsible for planning and implementing a JIT system. It includes consulting with employees, suppliers and customers regarding the change. This may require identification of training and other employee support as well as identifying possible logistical support.

The unit includes kanban-based JIT systems but also applies to other sectors and systems where a traditional kanban-type JIT may not be suitable through the unit's coverage of JIT principles.

This unit requires the application of skills associated with communication in gathering, analysing and applying information, consulting with stakeholders, problem solving, and demonstrating initiative and enterprise. This unit also requires aspects of self-management and learning to ensure feedback and new learning is integrated into the JIT design.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Design the JIT system/system improvements	1.1	Identify value chain members
		1.2	Consult with internal and external value chain members
		1.3	Identify current storage/inventory in value chain
		1.4	Determine flow authorisation indicators
		1.5	Determine minimum and maximum operations rate
		1.6	Determine lead time for product or service
		1.7	Determine number of units per kanban
		1.8	Draft workable procedures to implement JIT
2	Implement the JIT system/improvements	2.1	Consult with key internal stakeholders to develop solutions to JIT issues
		2.2	Ensure all stakeholders have required JIT-related skills and related issues have been resolved
		2.3	Liaise with key external members of the value chain to develop solutions to JIT issues
		2.4	Develop implementation plan for JIT
		2.5	Determine key measures of JIT
3	Monitor the JIT	3.1	Monitor key measures of JIT

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system	3.2	Regularly liaise with key stakeholders seeking areas for improvement
	3.3	Identify areas in need of improvement

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating at all levels in the organisation and value stream and to audiences of different levels of literacy and numeracy
- undertaking self-directed problem solving and decision-making on issues of a broad and/or highly specialised nature and in a wide variety of contexts
- analysing equipment, operations and value stream and determining best flow authorisation strategy, including:
  - form of kanban or flow authorisation indicator
  - integration with operations and other competitive systems and practices tools and techniques
  - key measures and monitoring strategy for JIT system
  - procedures to be adopted in the event of a non-conformance
- problem solving JIT issues and non-conformances to root cause

Required knowledge

Required knowledge includes:

- needs of internal and external value chain members
- principles of JIT, including:
  - demand pull
  - flow authorisation
  - kanban
  - capability rate
  - monitoring
  - non-conformance procedures
- reasons for delays/storages/inventories in the value stream and methods of reducing/eliminating them
- methods of identifying skill gaps and methods of filling skill gaps

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- key business objectives associated with implementing JIT
- principles of the operational processes relevant to the JIT implementation
- production data generated by the process and its application to JIT

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to:
	• develop a complete JIT system, including:
	  • implementation strategy
	  • key measures
	  • training and support strategy for employees and value chain members
	  • procedures in the event of a non-conformance
	• communicate and negotiate complex issues to a wide variety of individuals
	• supervise JIT implementation and suggest improvements.

Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a

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	combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	This unit may be assessed concurrently with: • MSS405002A Analyse and map a value stream, and/or • MSS405050A Determine and improve process capability. This unit is related to: • MSS402021A Apply Just in Time procedures • MSS403021A Facilitate a Just in Time system which cover the lowest and intermediate skill levels in competitive systems and practices respectively. Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of

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the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
JIT	JIT is a production scheduling concept that calls for any item or service needed at a production operation, whether raw material, components, fuel, power, finished item, or anything else in between raw material and delivery to the final customer, to be produced and available precisely when needed, neither a moment earlier nor a moment later. JIT principles may also be applied to non-product based manufacturing operations (e.g. where services

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	must be delivered on demand, such as transport)
Kanban	Kanban is a signal to authorise production or movement of an item to the next stage of production or operations. It is often a physical item for example a card, bin or sheet. When fully implemented, kanban operates according to the following rules: • all production and movement of parts, material or other necessary items takes place only as required by a downstream operation • the specific tool which authorises production or movement is called a kanban Kanban is typically applied to batch type operations and the production is measured in units produced. In continuous operations organisations, production is measured in terms of production rate (e.g. kg/h, tonne/day) and rate is increased/decreased according to the flow authorisation which may be a kanban (e.g. ticket or order from a supplier) or may be a SCADA signal from a remote facility (e.g. customer tank) saying that resupply is required or similar. In service operations a physical kanban may not be used – see flow authorisation indicator
SCADA	SCADA refers to: • a number of systems which automatically collect critical process data, perform required mathematical manipulations on it and then make control decisions and/or give required information personnel for action
Value stream	The value stream begins with the customer and includes all actions (both value-adding and non-value added) by both internal sections/departments and external organisations to meet a customer requirement. Depending on the operations and the customer requirement stages where value stream actions may occur include: • sales outlet/representative • information gathering, data analysis and research • product design • raw material sourcing • intermediate processing • final assembler/ collation/preparation • support services (e.g. accounting, finance and legal) • storage and delivery to customer

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	• after market support
Flow authorisation indicator	Flow authorisation indicator may include: • kanban bin, ticket or similar • other indicator of demand pull
Pull system	Pull system includes: • an operations planning system which makes to demand, rather than for stock or to a forecast
Cards/bins	Cards/bins include: • the indicators used for production authorisation and may be physical cards or bins or some other suitable indicator
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations Procedures may be: • written, verbal, computer-based or in some other format
Key measures	Key measures may include: • inventory levels • lead time • in full, on time and in specification (IFOTIS) delivery • productivity/production rate • other measures of pull through the value chain • quality

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Unit Sector(s)

Unit sector	Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405022A Design a process layout

Modification History

New unit, superseding MSACMT622A Design a process layout - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to design a process layout, typically a cellular flow, for either a jobbing shop or a continuous process manufacturer.

Application of the Unit

This unit provides the skill for a technical expert to apply the principles of competitive systems and practices to process design layout as distinct from volume production layout. While the application of the unit may be for an initial layout, in many cases it is likely to be for the redesign of an existing layout.

The unit is written on the assumption that there is an existing process. Where this is not the case, then additional competency in equipment/process design and selection will also be required through units from an appropriate technical qualification or Training Package.

This unit requires the application of skills associated with problem solving, initiative, enterprise, planning and organising in order to design a process for the manufacture of enterprise products that incorporates team operations, product flow, infrastructure and the layout of the physical environment and related technology. This unit has a strong emphasis gathering, analysing and applying information.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Identify the products and processes used in the organisation	1.1	Obtain or develop a process map of the existing process
		1.2	Identify all/main products/classes of products
		1.3	Obtain forecast sales and sales pattern of products/classes
		1.4	Obtain profiles of products/classes
		1.5	Group the products/classes into compatible families
2	Engineer the process	2.1	Make a preliminary selection of required equipment/technology/process for each process or product family
		2.2	Estimate required resource times for each family
		2.3	Calculate total resourcing required for each family
		2.4	Estimate appropriate lot size
		2.5	Determine viability of proposed families
		2.6	Examine draft proposal for possible improvements in process consistent with the competitive systems and practices strategy of the organisation
3	Design the infrastructure	3.1	Consult on layout needs with all stakeholders
		3.2	Identify physical infrastructure required by system

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		3.3	Identify information and control infrastructure required
		3.4	Identify work organisation required
		3.5	Identify occupational health and safety (OHS) and regulatory requirements to be taken into account
		3.6	Identify workforce development and training requirements
		3.7	Check the availability of required infrastructure and compatibility with requirements
4	Layout the process	4.1	Draft proposed process flow map
		4.2	Draft proposed configuration diagram
		4.3	Draft proposed space plan/layout
		4.4	Check availability of services/structural suitability, as appropriate
		4.5	Validate proposed layout with all relevant stakeholders
		4.6	Layout the process/work cell
		4.7	Develop implementation plan in liaison with relevant stakeholders
		4.8	Review layout after implementation

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating at all levels in the organisation and to individuals of different levels of literacy and numeracy
- undertaking self-directed problem solving and decision-making on issues of a broad and/or highly specialised nature and in a wide variety of contexts
- producing process flow maps

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- analysing the relationship between equipment, components, products, services and operators for existing and future layouts
- problem solving layout-related problems to root cause
- planning and organising implementation plans, including communication to stakeholders and any necessary training
- calculating and estimating size, volume and area and other layout related measures

Required knowledge

Required knowledge includes:

- typical customer requirements, including:
  - order size
  - order pattern
- processing requirements of products and jobs
- capabilities and maintenance requirements (e.g. access and services) of equipment
- abilities and skills of workforce
- OHS and regulatory requirements that may affect layout
- business requirements from layout

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • analyse products, operations and equipment and determine efficiencies that can be achieved by improved layout • determine OHS and regulatory impacts on a layout • supervise implementation of layouts • analyse implemented layouts and suggest further improvements.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area

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	• specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of

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the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Profiles	Profiles of products may include: • components/materials needed to manufacture • equipment/technology/processes required to manufacture • volume of activity to manufacture forecast amount
Compatible families	Compatible families include:

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	• products/classes requiring identical or similar operations equipment, technology or processes
Required resource times	Required resource times may include: • set-up time • equipment time • person time • process time
Lot size	Lot size may include: • external lot size • internal lot size • transfer batch size • kanban size
Viability	Viability includes: • appropriate calculated processing times • adequacy of equipment utilisation • acceptable maintenance implications • ability to meet OHS requirements • ability to meet environmental requirements • compliance with any legislative and regulatory requirements • acceptable to stakeholders
Stakeholders	Stakeholders include: • customers • employees • equipment suppliers and contractors (especially if new equipment required) Depending on the process and location, stakeholders may also include: • regulatory authorities • local community representatives • utilities (e.g. water and power)
Physical infrastructure	Physical infrastructure may include: • containers • material handling equipment • utilities supply (e.g. steam, air, gas, electricity and water)
Information and control infrastructure	Information and control infrastructure may include: • quality assurance

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	• statistical process control (SPC)/six sigma • planning systems/software • data collection and control systems/software
Work organisation	Work organisation includes: • number of personnel • skills mix of workforce

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405023A Develop a levelled pull system for operations and processes

Modification History

New unit, superseding MSACMT623A Develop a levelled pull system of manufacturing - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to develop and level a customer-driven demand pull system for operations and processes in order to balance the flow of work and minimise inventories.

Application of the Unit

This unit primarily applies to volume-based manufacturing organisations. However, the skills covered by the unit may also be applied in other organisations where the business is based on high volume processes initiated by customer demand signals (e.g. orders). The unit covers the production planning skills needed to develop and level a demand pull system which meets the business needs of the organisation. This may apply to the initial development of a pull system, or the continuous improvement of an existing system.

This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information and consulting with stakeholders. Problem solving, initiative and enterprise, and planning and organising are required to determine effective operations sequences and flow systems. This unit also requires aspects of self-management and learning to ensure feedback and new learning is integrated into system designs.

Depending on the organisation and its operations the following units may also be relevant:

- *MSS402080A Undertake root cause analysis*
- *MSS405002A Analyse and map a value stream*
- *MSS405021A Develop a Just in Time system*
- *MSS405022A Design a process layout*
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Analyse production systems	1.1	Acquire an 'as is' value map of the process for all major products
		1.2	Separate repeated products from specials
		1.3	Consult with production, maintenance, supervisory and management workforce on current production system and processes
		1.4	Establish rate of flow required to meet customer demand
		1.5	Identify process steps causing problems
		1.6	Analyse inventories within process and determine causes of high inventories
		1.7	Determine costs of problems and inventories
		1.8	Develop improved flow sequence and future value map
2	Establish sequence	2.1	Identify equipment and processes which can be sequenced by co-location
		2.2	Identify equipment which is not suitable for co-location
		2.3	Identify pacemaker process

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		2.4	Establish/review location of equipment for desired sequencing
3	Initiate or develop flow system	3.1	Determine rate and variability of demand for product
		3.2	Compare capability of flow sequence to demand rate and variability
		3.3	Set flow rate to level demand at pacemaker and handle variability
		3.4	Identify trigger for pacemaker process
		3.5	Establish kanban system for other process parts
4	Balance the work	4.1	Determine target time per product
		4.2	Standardise work processes and operations and establish procedures to monitor variation
		4.3	Adjust product/batch production to balance work
		4.4	Arrange for any required competency development of workforce
		4.5	Arrange for implementation of system
		4.6	Monitor operation of system and take appropriate action

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying and analysing production and other processes to identify variation from specifications
- solving problems to determine causes of variations to root cause
- communicating at all levels in the organisation and value stream and to audiences of different levels of literacy and numeracy

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- undertaking self-directed problem solving and decision-making on issues of a broad and/or highly specialised nature and in a wide variety of contexts
- analysing long or critical process steps and determine if they are pacemaker step
- setting and standardising operational processes around the requirements of the pacemaker process
- planning and organising implementation of a levelled pull production system
- documenting process steps
- performing calculations and interpreting data, including charts and diagrams related to establishing rate of flow and variation in process steps

Required knowledge

Required knowledge includes:

- technical and regulatory limits that must be adhered to in operations
- processing requirements of products or services offered by the organisation
- capabilities of equipment
- capabilities and skills of the workforce
- production planning techniques
- methods of calculating rates of demand and flow of work (e.g. takt and pitch)
- techniques for achieving a smooth and consistent flow of work, such as:
  - identifying pacemaker process
  - levelling the flow of work
  - balancing the allocation of resources
  - balancing the allocation of work
  - Just in Time (JIT)
  - Heijunka boxes
  - visual displays
- relationship of level of inventory to efficiency and waste

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • acquire a value stream map for current products and processes

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	• analyse process • perform required calculations to determine flow rate and variability • correctly identify pacemaker process • balance the work • monitor implementation of a levelled pull system and suggest improvements.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.

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Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted

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	so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Product	Product includes: • individual products and product groups/families
Inventories	Inventories within process may include: • cycle stock which reflects the replenishment quantity and frequency • buffer stock to meet demand variability and forecast errors • safety stock required to guard against quality and delivery failures upstream
Pacemaker	Pacemaker processes is that process which sets the pace for the flow of operations/work through the enterprise. Pacemaker processes may include, but are not limited to: • process steps which are significantly longer than other production stages • critical technical or quality steps in the production process
Takt time	Takt time is the time required to complete one job cycle if the customer's time and volume expectations are to be met, i.e. the available time divided by the number of units required, and so may include, but is not limited to: • time per piece where applied to piece work • time per tonne or litre when applied to bulk product • time per work item when applied to an office or service environment • deadlines required to meet delivery dates when applied to project work
Pitch	Pitch is the takt time averaged over a defined period and with available resources giving the rate of flow required to meet customer demand

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Balance work	Balance work means balancing: • time of production • effort required by workforce and equipment • work organisation • job design • quality considerations • waste and other cost considerations between stations/equipment/processes to achieve levelled pull within allowable time per product Balance work consideration also means: • undertaking adequate consultation with stakeholders • meeting occupational health and safety (OHS) and environmental requirements • any other regulatory and legislative requirements

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405030A Optimise cost of a product or service

Modification History

New unit, superseding MSACMT630A Optimise cost of product* - Not equivalent

* Prerequisite *MSACMT631A Undertake value analysis of product costs in terms of customer requirements* - removed

Unit Descriptor

This unit of competency covers the skills and knowledge required to examine the costs of a product or service and determine methods of reducing costs.

Application of the Unit

This unit applies to an individual a who is required to undertake a detailed study of a product or service's costs, including analysing it by its cost components to determining the best method of lowering the cost overall. This unit differs from *MSS405031A Undertake value analysis of a product or process costs in terms of customer requirements*, in that it looks at all costs, including overheads and takes a wider and more traditional approach to the cost of the product. Information and cost reduction strategies gained from the application of this unit may support other cost approaches in the enterprise, including value stream costing.

This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information. Problem solving, initiative and enterprise, and planning and organising are required to calculate cost components and determine cost optimisation strategies. This unit also requires aspects of self-management and learning to ensure feedback and new learning is integrated into costing methods.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Analyse total cost components of a product or service	1.1	Identify all cost components of product or service
		1.2	Allocate cost components to major categories, such as overhead, depreciation, energy, consumables and labour
		1.3	Distinguish between costs which directly deliver customer features/benefits and waste
2	Optimise costs	2.1	Analyse causes of costs which lead to customer features/benefit
		2.2	Determine methods of increasing the customer benefit/cost ratio
		2.3	Analyse causes of waste costs
		2.4	Determine methods of reducing/eliminating waste costs
		2.5	Analyse interactions between cost components
		2.6	Check that one method of reducing costs does not cause an increase in another cost/reduction in consumer benefit
		2.7	Check that cost reduction plans do not reduce required levels of regulatory compliance or occupational health and safety (OHS)
3	Implement cost optimisation	3.1	Develop cost optimisation plans
		3.2	Negotiate with relevant people to agree on implementation plans

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3.3 Take actions to implement the cost optimisation

3.4 Monitor the implementation of the cost optimisation

3.5 Make adjustments to the plan, as required

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- undertaking self-directed problem solving and decision-making on issues of a broad and/or highly specialised nature and in a wide variety of contexts
- communicating at all levels in the organisation and value chain and to audiences of different levels of literacy and numeracy
- identifying relevant cost component categories for organisation, product and process
- identifying customers, including final customer and features/benefits as valued by customers
- expressing customer features/benefits in cost terms
- determining application scope of cost reduction plan, including product/s, areas, employees and suppliers included in plan

Required knowledge

Required knowledge includes:

- cost components of product
- major costs which are controllable (and how to control them)
- concept and types of waste (muda)
- interrelationship of cost components and costs and benefits, including:
  - methods of estimating costs/benefits
  - acceptable benefit/cost ratios

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • determine relevant cost categories for a product or service • determine which costs are waste • develop a cost optimisation plan • implement and monitor the plan .
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads, hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace project(s) • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and

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	disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree

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	Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Within operations, categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items • activities which do not yield any benefit to the organisation or any benefit to the organisations customers
Cost	Cost includes: • the monetary value of expenditures able to be directly identified for supplies, services, direct labour, materials, components, cost of inventory, faults and reworks, rejects/scrap, equipment and other items used in the production of the product • allocations and estimates for indirect costs (e.g. indirect labour, rent, energy, water and cost of capital) where a direct monetary value cannot be identified
Cost optimisation plans	Cost optimisation plans should include: • application scope (e.g. product/s, services, areas, employees and suppliers included in plan) • target costs and target cost reductions • implementation period • method of monitoring • method of communicating progress to stakeholders

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Unit Sector(s)

Unit sector	Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405031A Undertake value analysis of product or process costs in terms of customer requirements

Modification History

New unit, superseding MSACMT631A Undertake value analysis of product costs in terms of customer requirements* - Not equivalent

* Prerequisite *MSACMT230A Apply cost factors to work practices* - removed

Unit Descriptor

This unit of competency covers the skills and knowledge required by an employee who is required to analyse products and processes to determine the value-adding factors, including design and processing costs that most impact on meeting customer requirements and which may also include competitor benchmarking. The unit also includes implementing identified changes that increase cost-efficiency. The unit may be applied individually or in a team environment.

In this unit an employee uses an analysis of the benefits/features which a customer perceives to be in a product or service as a basis for determining appropriate or unnecessary cost and so identifying and reducing waste.

Application of the Unit

This unit applies to an individual who undertakes the value analysis of a product or service, establishing the features/benefits obtained by customers from the cost components relating to those benefits. From this appropriate or waste cost will be determined and actions taken to either reduce waste or improve saleability.

This unit differs from *MSS405030A Optimise cost of a product or service*, in that it requires costs to be measured against customer features/benefits and is designed to contribute to value stream costing. *MSS405030A Optimise cost of a product or service* complements this unit by allowing detailed analysis of all costs, including overheads.

This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information. Problem solving, initiative and enterprise, and planning and organising are required to determine cost-efficiencies. This unit also requires aspects of self-management and learning to ensure feedback and new learning is integrated into costing methods.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Analyse customer benefits to determine appropriate or waste costs	1.1	Analyse product or service to determine features/benefits perceived by customer in product
		1.2	Analyse cost components of product or service and determine those which deliver customer features/benefits and those which are either appropriate or waste
		1.3	Determine any additional features that may be added to improve saleability
		1.4	Analyse waste cost components and allocate to direct and indirect cost categories
		1.5	Determine options for reducing direct and indirect waste costs
		1.6	Select cost-related actions which maximise customer benefits and minimise costs
		1.7	Where required, undertake competitor benchmarking to provide reference points

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2	Analyse performance variance	2.1	Identify waste processing or operational steps for product or service following completion of customer benefit analysis
		2.2	Analyse all costs and determine methods of reducing costs/waste
		2.3	Develop plan and recommendations for actions required to achieve cost improvement or added customer benefits to improve saleability
		2.4	Submit plan and recommendations to stakeholders

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- undertaking self-directed problem solving and decision-making on issues of a broad and/or highly specialised nature and in a wide variety of contexts
- communicating at all levels in the organisation and value chain and to audiences of different levels of literacy and numeracy
- determining customer features/benefits added to products at each operational step
- relating cost components to customer features/benefits
- distinguishing between direct and indirect costs
- identifying relevant cost component categories for product
- determining application scope of cost reduction plan, including products, areas, employees and suppliers included in plan
- undertaking competitor benchmarking for reference in cost analysis

Required knowledge

Required knowledge includes:

- customer features/benefits from products
- impact of customer features/benefits on sales, market share and firms profitability
- performance and cycle times for products made or service provided
- major costs which are controllable (and how to control them)
- types of waste (muda)
- methods of reducing waste

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- methods of reducing cycle time
- desirability of improving performance and methods of reducing cycle time

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • identify customer features/benefits for a product and their impact on market share or saleability of the product • determine direct/indirect costs in a product • determine which costs are waste • analyse cycle times and make suggestions for reduction in cycle time • develop a cost/waste reduction plan.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented. or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation

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	• case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and

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	analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Within operations, categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items • activities which do not yield any benefit to the organisation or any benefit to the organisations customers
Cost	Cost includes: • the monetary value of expenditures able to be directly identified for supplies, services, direct labour, components, cost of inventory, faults and reworks, rejects/scrap, equipment and other items used in the production of the product • allocations and estimates for indirect costs (e.g. indirect labour, rent, power and water) where a direct

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	monetary value cannot be identified
Determine customer feature/benefits	This unit does not require that customer features/benefits must be obtained by the person undertaking the unit directly contacting customers. The features/benefits may have already been determined by sales and marketing personnel and passed on to operations. However, the unit requires that the product or process must be analysed to determine how the product or process supplies the features/benefits and by which step/feature of the product or process
Performance	Performance is may be thought of as the rate of output or delivery of the performance or service compared to the rate required to meet demand for the product or service
Cycle time	Cycle time includes: • the normal time to complete an operation on a product
Pull	Pull is the concept of producing to demand, rather than for stock or some forecast

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405032A Analyse cost implications of maintenance strategy

Modification History

New unit, superseding MSACMT632A Analyse cost implications of maintenance strategy - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to analyse the cost implications of different maintenance strategies and to adjust or adopt a strategy to minimise or eliminate unnecessary costs.

Application of the Unit

This unit applies to an individual in an organisation who is selecting or reviewing its proactive maintenance strategy. While technical factors are significant in the choice of maintenance strategy and tools, cost factors will also impact on the selection of a maintenance strategy. This unit covers the cost analysis of maintenance strategies and complements the technical analysis covered in MSS405081A Develop a proactive maintenance strategy. The technical analysis may be performed by the same or a different person to the person undertaking the cost analysis.

This unit primarily requires the application of skills associated with communication in gathering, analysing and applying costing information and consulting with maintenance personnel. Problem solving, initiative and enterprise, and planning and organising are required to analyse and estimate the cost of maintenance strategies.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Analyse cost components of maintenance	1.1	Determine cost of failure of plant/equipment
		1.2	Determine cost of a planned maintenance shutdown activity, including costs of re-start
		1.3	Determine cost of maintenance for a planned activity
		1.4	Determine cost of maintenance for an unplanned activity
		1.5	Determine costs of condition monitoring
		1.6	Identify cost implications of different maintenance strategies
2	Estimate life cycle costs of plant/equipment	2.1	Determine initial capital cost
		2.2	Estimate servicing, maintenance and repair costs
		2.3	Estimate production and other costs associated with service, maintenance and repair
		2.4	Determine depreciation and other applicable allowances
		2.5	Estimate ancillary costs, such as training, commissioning and productivity loss
		2.6	Estimate technological life and costs of changing to current technology/costs of retaining obsolete equipment
		2.7	Estimate annualised costs in present value terms
		2.8	Identify life cycle cost implications for strategy

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3	Liaise with proactive maintenance strategy developer	3.1	Identify cost implications for different strategies
		3.2	Negotiate a strategy which minimises total costs
		3.3	Monitor the implementation of the strategy to ensure the costs are minimised
		3.4	Make required adjustments to strategy

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- undertaking financial modelling and calculations relevant to different maintenance scenarios
- reading and interpreting charts and diagrams
- communicating with stakeholders, including technical and production staff to identify implications of maintenance strategies
- identifying sources of information on depreciation, allowances and ancillary costs
- analysing data and qualitative information on impact of different maintenance strategies on meeting customer needs
- solving problems to root cause
- preparing strategies and recommendations for stakeholders

Required knowledge

Required knowledge includes:

- techniques, calculations and data used in different maintenance strategies
- cost components of maintenance strategies
- interrelationship of cost components and maintenance activities

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify and analyse data and other information on current and potential maintenance strategies • communicate effectively with operators, maintenance personnel, engineers and other stakeholders on implications of maintenance strategies • make recommendations on optimal maintenance strategies from a cost perspective.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made

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	to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts

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	• standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Maintenance strategies and techniques	Maintenance strategies and techniques may include: • total productive maintenance (TPM) • reliability centred maintenance (RCM) • root cause analysis (RCA) • mean time between failures (MBTF) • failure mode and effects analysis (FMEA) • condition monitoring
Cost components of maintenance	For costing purposes, maintenance strategies should include: • direct costs, such as labour and materials, and also include comparison with cost of equipment replacement, re-engineering, and breakdown repair strategies, as well as cost of lost production under different maintenance strategies
TPM	TPM is an application of total quality management to maintenance with the intention of increasing reliability, getting it right first time and increasing OEE
RCM	RCM moves maintenance from reactive, or even planned/programmed towards a focus on uptime and OEE
RCA	RCA is a formal problem solving technique. In RCA there are many possible causes of any problem. Eliminating some will have no impact, while eliminating others will ameliorate the problem. However, elimination of the root cause will eliminate the problem completely. There should only be one root cause for any problem and so the analysis should continue until this one cause is found. Elimination of the root cause permanently eliminates the problem
OEE	OEE is the combination of the main factors causing loss of productive capacity from equipment/plant and is:

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	OEE = availability x performance x quality rate where: • availability takes into account losses due to breakdown, set-up and adjustments • performance takes into account losses due to minor stoppages, reduced speed and idling • quality rate takes into account t losses due to rejects, reworks and start-up waste
Uptime	Uptime refers to the overall availability of the plant (it is the inverse of downtime) or the unavailability of the plant. Ideal uptime is 100%
MTBF	MTBF is one key measure of the effectiveness of a maintenance procedure, and is an indicator as to whether root causes are being found and resolved. If MTBF is reducing, then it is an indicator that the maintenance regime is failing. There are many possible causes of any problem. Eliminating some will have no impact, others will ameliorate the problem. However, elimination of the root cause will eliminate the problem. There should only be one root cause for any problem and so the analysis should continue until this one cause is found. Elimination of the root cause permanently eliminates the problem. Depending on the equipment, operations and procedures of the organisation, alternative statistical records of maintenance and maintenance related events may be substituted for MTBF providing they relate strategies for improving OEE.
FMEA	FMEA is a systematic approach that identifies potential failure modes in a system, product, or process caused by either design or operations/assembly process deficiencies. It also identifies critical or significant design or process characteristics that require special controls to prevent or detect failure modes. FMEA is a tool used to prevent problems from occurring. Some industry sectors have highly adapted forms of FMEA and may practice traditional FMEA in say their routine maintenance while using another technique, such as Hazard and Operability Studies (HAZOP) for design and modification. HAZOP) is a form of FMEA which has been practiced by the process industries for over 30 years and examines the implications of changes in process conditions to

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	process stability.
Condition monitoring	In this unit condition monitoring is used to describe the process of analysing the implications of condition monitoring data for proactive maintenance whether it be obtained from non-destructive testing (NDT) reports, visual assessment by experts, diagnostic reports obtained from SCADA or other enterprise or equipment software and product or process quality analyses

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405040A Manage 5S system in an organisation

Modification History

New unit, superseding MSACMT640A Manage 5S system in a manufacturing environment - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required for the overall management of the 5S system in an organisation.

Application of the Unit

This unit applies to an individual who is responsible for ensuring the smooth operation and continuous improvement of the 5S system in an organisation. This may be for an initial introduction of, or for the ongoing implementation and continuous improvement resulting from, 5S.

This unit requires the application of skills associated with problem solving, planning, communication and teamwork.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

1	Organise an appropriate environment for 5S	1.1	Ensure managers and other key stakeholders support and understand 5S
		1.2	Arrange for team leaders to develop/maintain skills required for 5S
		1.3	Ensure team leaders are developing/maintaining skills required in their team members
		1.4	Ensure procedures and work practices reflect 5S needs and regulatory requirements
		1.5	Practise 5S in own work
		1.6	Eliminate roadblocks to 5S
2	Audit 5S implementation	2.1	Undertake spot checks of compliance
		2.2	Review workplace and records for indicators of compliance/non-compliance
		2.3	Encourage all levels of the workforce to routinely suggest areas for improvement
		2.4	Discuss 5S routinely with team leaders to seek ideas for implementation of improvement suggestions and encourage identification of non-conformance
3	Improve 5S	3.1	Negotiate solutions to non-conformances
		3.2	Implement agreed solutions
		3.3	Work with team leaders to develop opportunities for improvements
		3.4	Provide necessary resources for improvements
		3.5	Ensure procedures and practices change to reflect

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improvements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating with stakeholders on aims and objectives of 5S program in the organisation
- mentoring and monitoring team leaders in their skills and knowledge of 5S and the organisations objectives for 5S
- conducting formal and informal meetings and explaining 5S and related concepts
- reviewing regulatory requirements for implications for 5S implementation
- facilitating team goals, activities and communications and accessing resources
- problem solving 5S poor performance and problems to root cause
- identifying requirements and negotiating resources for 5S implementation across the organisation
- planning and prioritising activities of teams
- identifying problems in 5S implementation caused by gaps in skills and/or knowledge and developing options to address them

Required knowledge

Required knowledge includes:

- organisation operations and structure
- principles of efficient workplace organisation
- purposes and methodology of 5S
- operation procedures relevant to jobs in the organisation
- relevant regulatory requirements
- processes for identification of skill gaps
- methods of addressing skill gaps
- ways of encouraging team leaders and operators to find and suggest areas for improvement
- methods of making/recommending improvements
- methods of accessing required resources
- non-conformance, what they are, assessment of severity and action to be taken

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • encourage and monitor a systematic approach to implementing 5S • analyse areas and records for evidence of 5S conformance/non-conformances • manage non-conformances in implementation of 5S • lead and motivate others in achieving 5S outcomes and making improvements to the 5S systems.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads, hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence.

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	In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE)

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	• takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations Procedures may be: • written, verbal, computer-based or in some other format
Roadblocks	Roadblocks include: • all factors which are inhibiting the smooth implementation of 5S
5S	5S is a system of work organisation originally developed in Japan based around housekeeping principles. A close translation of the five stages in the housekeeping approach is: • sort • set in order • shine • standardise • sustain
Sort	Sort involves keeping only what is absolutely necessary

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	for the processes in the work area. Sort includes: • clearing the work area of all non-essential equipment and materials Non-essential items include: • those not required to either produce product, conduct process or operations or make required adjustments to equipment during process or operations
Set in order	Set in order includes: • assigning required equipment and materials appropriate locations in the work area (locations should be clearly marked and labelled to show the item and proper location)
Shine	Shine includes: • keeping the work area clean at all times. This should be carried out to a regular daily schedule against allowed time and, on most occasions, at the end of a job
Standardise	Standardising includes: • activities that help maintain the order and the housekeeping standards • using procedures and checklists developed from a procedure

Sustain	Sustain includes:
	• making sure that daily activities are completed every day regardless of circumstance
	• undertaking inspections, including:
	  • informal inspections carried out often, at least weekly
	  • formal inspections carried out at least monthly
	Specific actions should be followed up to generate continuous improvement

Items in work area	Items in work area may include: • tools • jigs/fixtures • materials/components • plant and equipment • manuals • personal items (e.g., lunch boxes and posters) • safety equipment and personal protective equipment

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	• other items which happens to be in the work area

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405041A Implement improvement systems in an organisation

Modification History

New unit, superseding MSACMT641A Implement a continuous improvement system - Not equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to introduce and institutionalise continuous improvement and breakthrough improvement processes in an organisation.

Application of the Unit

This unit applies to an individual responsible for the introduction of improvement systems across an organisation. The systems will include a continuous improvement system sometimes also known as kaizen, and breakthrough improvement sometimes known as kaizen blitz.

The continuous improvement (kaizen) system consists of strategies for continuously monitoring for and implementation of incremental improvements to processes, operations and products. Breakthrough improvement ‘events’ (kaizen blitz) covers the identification of improvement opportunities that are best undertaken in a single exercise.

This unit primarily requires the application of skills associated with teamwork, problem solving, initiative and enterprise, and planning and organising skills in order to identify, implement and institutionalise kaizen activity. Communication skills are required to gather information and consult with team members and other stakeholders. This unit also requires aspects of self-management and learning to ensure feedback and new learning is integrated into continual improvement.

Depending on the starting point for the continuous improvement program in the enterprise other relevant units may need to be selected, including:

- *MSS402080A Undertake root cause analysis*
- *MSS405011A Manage people relationships*
- *MSS405040A Manage 5S system in an organisation*
- *MSAPMSUP390A Use structured problem solving tools.*
-

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Prepare for improvement systems implementation	1.1	Determine scope of improvement systems
		1.2	Identify key performance indicators (KPIs) for inclusion in improvement systems
		1.3	Prepare operating instructions and other required documentation for continuous and breakthrough improvement systems
		1.4	Ensure compliance with health, safety and environment (HSE) and other regulatory requirements are addressed in improvement instructions
		1.5	Identify and brief implementation team
		1.6	Prioritise areas operation, or processes requiring early action
		1.7	Prepare communication strategy for employees and other stakeholders
		1.8	Make infrastructure and support arrangements for improvement systems

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		1.9	Obtain required approvals for commencement of improvement systems
2	Implement improvement systems	2.1	Arrange for initial training in continuous improvement (kaizen) and related competitive systems and practices for employees
		2.2	Facilitate the development of operating protocols for continuous improvement at the team level
		2.3	Establish decision making mechanism for system level continuous improvement
		2.4	Invite suggestions for breakthrough improvements
		2.5	Establish mechanism for prioritising breakthrough improvements
		2.6	Establish breakthrough teams and implement priority breakthrough events
		2.7	Clarify points of disagreement/uncertainty over improvement systems implementation through consultation and, where required, by reference to procedures or other relevant authority
3	Monitor implementation of improvement systems	3.1	Consult stakeholders on processes and perceived success of early implementation of continuous and breakthrough improvement events
		3.2	Analyse processes and operations to quantify variations in KPIs over early period of implementation of improvement systems
		3.3	Identify and solve ongoing performance issues
		3.4	Negotiate any differences between problems and proposed solutions
		3.5	Develop plans and obtain agreements to implement further improvements
		3.6	Implement improvements
		3.7	Measure changes and calculate benefits

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		3.8	Complete all relevant documentation
		3.9	Communicate achievements to stakeholders
4	Institutionalise continuous improvement	4.1	Arrange for regular reviews of improvement systems
		4.2	Integrate improvement system reports with other reporting processes, including visual management systems
		4.3	Arrange for regular reporting of improvement system results to customers and other critical stakeholders

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- implementing continuous and breakthrough improvement in a variety of contexts, including a mixture of supportive and non-supportive team environments
- undertaking self-directed problem solving and decision-making
- communicating across all levels in the organisation and to people of different levels of literacy
- analysing customer features/benefits, organisation goals and past performance and setting KPIs for inclusion in a continuous improvement system
- prioritising improvement suggestions in terms of:
  - the extent to which they add to customer features/benefits
  - feasibility
  - cost
- preparing operating procedures and other documentation, including establishing version control and amendment procedures
- analysing information and data to identify variation and evaluate improvements
- measuring and calculating performance variables
- solving problems to root cause
- identifying waste (muda)

Required knowledge

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Required knowledge includes:

- continuous and breakthrough improvement (kaizen and kaizen blitz) philosophy and process
- competitive systems and practices, including:
  - value stream mapping
  - 5S
  - Just in Time (JIT)
  - mistake proofing
  - process mapping
  - establishing customer pull
  - setting of key performance indicators/metrics
- types of KPIs and their impacts on performance
- improvement processes, including implementation, monitoring and evaluation strategies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • interpret operations, processes and products in terms of customer features/benefits and then set appropriate KPIs • prepare appropriate documentation for continuous and breakthrough improvement processes • establish decision making processes for considering system level continuous improvement suggestions • encourage and lead others in implementing continuous improvement system • problem solve implementation issues with continuous improvement system • lead and motivate others in planning, implementing and sustaining improvements.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area

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	• specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of

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the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Scope of improvement systems	The scope of the improvement systems includes: • target divisions, operations, work processes, products and sites that stakeholders want included in a particular improvement system • goals and objectives of the organisation: • levels of targeting for the continuous improvement system, including the system level

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	focusing on the value stream and the overall achievement of customer defined features/benefits • process level focusing on individual processes, teams and team leaders
Relevance of KPIs	Relevance of KPIs includes: • appropriateness (did they lead to/encourage desirable performance?) • currency (are they still encouraging desirable performance?) • unintended consequences (do they lead to outcomes which are not desirable – even if some performance is desirable?) • signal/noise (is the balance between desirable and undesirable outcomes strong and positive?)
Instructions for incremental or breakthrough improvement processes	Instructions for incremental or breakthrough improvement process include: • methods for employees to suggest incremental or breakthrough improvement • criteria for identifying a breakthrough improvement need • approval processes • monitoring and reporting processes
Procedures	Procedures may include: • work instructions • standard operating procedures • formulas/ recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plant, process or operation • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations • required procedures under legislation or regulation, awards and enterprise agreements Procedures may be: • written, verbal, computer based or in some other format
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not

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	contribute to customer benefit/features in the product or process. Categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items • activities which do not yield any benefit to the organisation or any benefit to the organisations customers
Solve performance issues	Solving performance issues includes: • generating improvement ideas (brainstorming/asking experts) • selecting most appropriate improvement ideas to proceed with • conducting experiments where required to test idea • making final selection of improvement ideas • determining most appropriate improvement strategy (i.e. incremental or breakthrough (kaizen blitz) improvement)

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405050A Determine and improve process capability

Modification History

New unit, superseding MSACMT650A Determine and improve process capability* - Equivalent

* New prerequisite *MSS404052A Apply statistics to operational processes* superseding MSACMT452A Apply statistics to processes in manufacturing

Unit Descriptor

This unit of competency covers the skills and knowledge required to determine the actual (as distinct from design) capability of a process and then to analyse that process to remove assignable causes and reduce random causes. This would typically be done by a manager or technical expert support person either working in a team, or in close liaison with key stakeholders. Process capability is typically calculated using standard deviations.

Application of the Unit

This unit applies to an individual (who may be a production manager, plant/process engineer, technical specialist or similar) who is responsible for developing plans to stabilise and then improve process capability and following agreement the implementation of the plans to improve process capability. The organisation may use either a six sigma or three sigma process.

This unit primarily requires the application of skills associated with communication in gathering and analysing data and consulting with relevant personnel. Teamwork, problem solving, initiative and enterprise, and planning and organising are required to determine causes to variations and implement solutions. This is done in an environment using computer technology and also requires aspects of self-management and learning to ensure feedback and new learning is integrated into process improvements and operations management control systems.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS404052A Apply statistics to operational processes

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Obtain data for process capability study	1.1	Identify the process requiring capability analysis including relevant procedures
		1.2	Identify customer specifications for product or service
		1.3	Obtain process capability data
2	Analyse data	2.1	Identify assignable causes of variation in liaison with relevant personnel
		2.2	Develop solutions to eliminate variation due to assignable causes in liaison with relevant personnel
		2.3	Analyse random variations for possible causes in liaison with relevant personnel
		2.4	Confirm causes of random variation
		2.5	Develop solutions to reduce random variations in liaison with relevant personnel
3	Take action to improve process	3.1	Develop plans to implement solutions
		3.2	Liaise with relevant personnel to implement solutions

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capability	3.3	Gain necessary approvals, as required
	3.4	Monitor implementation and make adjustments, as required
	3.5	Determine new/revised process capability
	3.6	Implement revised process capability regime

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- using a variety of statistical methods and calculations
- communicating and negotiating at all levels in the organisation and value stream and with individuals of different levels of literacy and numeracy
- negotiating with employees, suppliers and customers, where necessary, to achieve access to, or collection of, data
- planning process and data collection changes required for process improvement, including:
  - objectives
  - performance indicators to be monitored to indicate success of change
  - resources required
  - training required
  - communication and liaison required with employees, suppliers and customers
  - implementation period required
- analysing variations and categorising into assignable and random cause
- undertaking self-directed problem solving and decision-making on issues of a broad and/or highly specialised nature and in a wide variety of contexts
- working in and leading teams for data collection and process improvement
- using software computers and terminals, as required, to collect and analyse data

Required knowledge

Required knowledge includes:

- data collection methods
- data processing techniques required to establish variability and normal distribution
- calculate three sigma or six sigma processes, as relevant

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- random and non-random results and processes for recognition of assignable causes
- causes of different types of non-random results
- causes of random variation
- process understanding sufficient to translate the data into variations in the process and determine methods of controlling them

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • collect or obtain data relevant process capability data from a variety of sources data • work with people and analyse data to determine assignable causes • plan and prepare improvement proposals • monitor implementation of improvement proposals.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects

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	• suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems

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	• supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Six sigma	Six sigma refers to: • a statistical tool for recording defects and determining capability which equates to only 3.4 defects per million opportunities for each product or service transaction Six sigma is also used as a general term covering a competitive systems and practices approach. Six sigma training typically covers several units of competency in this Training Package
Three sigma	Three sigma refers to: • a traditional statistical process control uses three sigma limits which equates to 3 defects per thousand opportunities for each product or service transaction
Process capability data	Process capability data includes: • customer requirements for product or service • process stability (control chart) performance • other charts and data
Procedures	Procedures may include: • work instructions • standard operating procedures

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	• formulas/recipes • batch sheets • temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) • government regulations Procedures may be: • written, verbal, computer-based or in some other format

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405052A Design an experiment

Modification History

Release 2 - Prerequisite unit code corrected - MSS404052A

Release 1 - New unit, superseding MSACMT652A Design an experiment* - Equivalent

* New prerequisite *MSS404052A Apply statistics to operational processes* superseding MSACMT452A Apply statistics to processes in manufacturing

Unit Descriptor

This unit of competency covers the skills and knowledge required to design experiments. The design of experiments is generally undertaken as part of black-belt six sigma but may also be undertaken independently.

Application of the Unit

This unit applies to a technical expert who is required to design and implement experiments aimed at making breakthrough improvements in the process. They will work with other members of the process team in doing this.

This unit primarily requires the application of skills associated with problem solving, initiative and enterprise, and planning and organising skills in order to identify, implement and evaluate an experiment. Communication skills associated with gathering, interpreting and documenting information are required.

Where this unit forms part of a suite of six sigma then the following units will also be relevant:

- *MSS403010A Facilitate change in an organisation implementing competitive systems and practices*
- *MSS403051A Mistake proof an operational process*
- *MSS404081A Undertake proactive maintenance analyses*
- *MSS405002A Analyse and map a value stream*
- *MSS405011A Manage people relationships*
- *MSS405050A Determine and improve process capability*
- MSS405053A Manage application of six sigma for process control and improvement
- *MSAPMSUP390A Use structured problem solving tools.*
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Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

MSS404052A Apply statistics to operational processes

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Choose an improvement project	1.1	Review a process/value stream map
		1.2	Identify areas in need of improvement
		1.3	Select a process/value stream area for analysis and improvement
		1.4	Determine the objective of the experiment in consultation with relevant stakeholders
2	Design the experiment	2.1	Select appropriate factorial design
		2.2	Estimate signal to noise ratio
		2.3	Determine required number of runs and factorial fraction
		2.4	Determine resolution
		2.5	Design a sequential series of experiments
		2.6	Calculate resource requirement for this design

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		2.7	Determine whether resource requirements are practical in consultation with relevant stakeholders
		2.8	Modify experiment, if required, to match available resources
		2.9	Determine/develop required metrics
3	Conduct the experiment	3.1	Conduct first run of experiment
		3.2	Replicate in random order for required number of runs
		3.3	Block out known sources of variation
		3.4	Conduct other experiments in series
		3.5	Record data/have data recorded
4	Analyse and confirm the experimental results	4.1	Identify aliases/confounding of variables/results
		4.2	Analyse data using statistics pack or similar
		4.3	Interpret analysed data in line with objectives
		4.4	Identify confidence level of analysed data
		4.5	Design experiment to confirm correlations identified
		4.6	Conduct confirming experiment
		4.7	Analyse data from confirming experiment
		4.8	Confirm results (or conduct further experiments)

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- analysing existing statistics and other data for relevance to the experiment

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- determining where additional data is required and developing strategies for acquisition
- undertaking self-directed problem solving and decision-making
- solving problems
- communicating complex issues and techniques to stakeholders
- documenting procedures and results
- producing a range of charts and generating and validating required data for inclusion
- using statistics packs

Required knowledge

Required knowledge includes:

- charting, such as:
  - Pareto charts
  - main effects plots
  - scatter plots
  - interaction plots
  - contour plots
  - response surface plots
- statistical principles and analysis, such as:
  - analysis of means (ANOM)
  - prediction equations
  - analysis of variance (ANOVA)/one-way ANOVA
  - desirability function
  - hit a target
  - advanced graphical data analysis
  - multi-variate planning
  - variation trees and funneling
  - hypothesis testing
  - central limit theorem
  - statistical analysis roadmap
  - analysis for means and t-test
  - correlation and regression
- factorial analysis principles and methods, such as:
  - multi-variate analysis
  - Taguchi S/N ratios
  - 2/3 level factorial
  - Taguchi L8
  - 2/4-1 half fraction
  - Plackett-Burman 8-run

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  - full factorial
- acceptance criteria/confidence levels

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • design an experiment relevant to improvement strategies and targets of the organisation • conduct an experiment • confirm results, including conduct of confirming experiments.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning

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	• reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen)

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	• breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Improvement	Improvement includes: • an improvement in performance of an area/section or the whole enterprise as measured in terms of customer features/benefits
Objective of the experiment	Objective of the experiment may include: • screen factors to find the critical few • optimise a few critical factors • solve process problems • reduce waste • increase reliability
Factorial design	Factorial design may include: • 2/3 level factorial • Taguchi L8 • 2/4-1 half fraction • Plackett-Burman 8-run • full factorial
Signal-to-noise ratio	Signal-to-noise ratio may be estimated from: • previous experiment design experience • previous process capability studies • statistical process control data • estimated from other sources
Resolution	Resolution is typically: • Resolution III design: A design where main factor

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	effects are confounded with two factor and higher order interactions • Resolution IV design: A design where main effects are confounded with three factor and higher order interactions and all two factor interactions are confounded with two factor interactions and higher order interactions • Resolution V design: A design where main effects are confounded with four factor and higher order interactions and two factor interactions are confounded with three factor interactions and higher order interactions
Sequential series of experiments	A typical series of experiments consists of: • a screening design (fractional factorial) to identify the significant factors • a full factorial or response surface design to fully characterise or model the effects • confirmation runs to verify results
Required metrics	Required metrics may include: • quantitative measures normally associated with the process • other quantitative measures relevant to the experiment • ranking systems for normally qualitative measures, such as defectives
Statistics pack	Typical statistics packs include: • minitab • JMP • spreadsheets, such as Excel, particularly with specific add-ons, such as Sigma XL, Analyse It or other add-ons

Unit Sector(s)

Unit sector Competitive systems and practices

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Custom Content Section

Not applicable.

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MSS405053A Manage application of six sigma for process control and improvement

Modification History

Release 2 - Prerequisite unit code corrected - MSS404052A

Release 1 - New unit, superseding MSACMT653A Apply six sigma to process control and improvement* - Equivalent

* New prerequisite *MSS404052A Apply statistics to operational processes* superseding MSACMT452A Apply statistics to processes in manufacturing

Unit Descriptor

This unit of competency covers the skills and knowledge required to manage six sigma in the workplace for the purposes of process control and process improvement.

Application of the Unit

This unit covers the skills and knowledge needed by a technical expert in managing the application of six sigma in an organisation in order to minimise defects and make improvements to processes and/or products. Depending on the need the expert will apply six sigma processes themselves or work with, and advise, other employees in applying six sigma processes.

This unit requires the application of skills associated with problem solving, initiative, enterprise, planning and organising in order to apply six sigma in the workplace. This unit requires skill in gathering, analysing and applying information and data.

Depending on the situation of the enterprise and the complexity of their operations process the following units may also be required in implementing six sigma at an enterprise:

- *MSS403010A Facilitate change in an organisation implementing competitive systems and practices*
- *MSS403051A Mistake proof a production process*
- *MSS404081A Undertake proactive maintenance analyses*
- *MSS405002A Analyse and map a value stream*
- *MSS405011A Manage people relationships*
- *MSS405050A Determine and improve process capability*
- *MSS405052A Design an experiment*
- *MSAPMSUP390A Use structured problem solving tools*.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS404052A Apply statistics to operational processes

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Review process data	1.1	Confirm area of responsibility/study with executive leaders and other stakeholders
		1.2	Review statistical process control (SPC), process capability and other relevant data for area of responsibility/study
		1.3	Identify shifts in process performance and processes requiring improvement
		1.4	Quantify the shifts in performance which have occurred or which are desired
		1.5	Determine cost of shift in performance and cost of intervention
		1.6	Identify improvement priorities and degree of intervention

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2	Apply define, measure, analyse, improve, and control and standardise (DMAIC) process to priority areas	2.1	Define improvement project
		2.2	Determine if a six sigma project team is to be established or project undertaken individually
		2.3	Determine metrics and acquire initial data
		2.4	Analyse data and determine possible causes of performance shifts/process improvements
		2.5	Develop and trial improvement solutions
		2.6	Control and standardise the improvement
3	Establish/review control strategies	3.1	Determine sampling schedule
		3.2	Analyse data to determine process capability
		3.3	Develop process control strategy
		3.4	Confirm strategy with all stakeholders
		3.5	Identify skills required to implement and monitor process control strategy
		3.6	Arrange training, where required, for employees in skills and techniques needed for process control strategy
4	Review and confirm improvement	4.1	Calculate and document benefits
		4.2	Ensure procedures and other relevant documentation is updated for improved procedure
		4.3	Review process data after an appropriate period and confirm the improvement

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

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Required skills include:

- identifying and defining six sigma projects
- developing procedures for collection and analysis of data
- reporting and presenting data and quantitative information
- analysing priorities and improvement projects and determining where individual or team effort is required
- determining and completing appropriate charts for a project
- communicating and explaining DMAIC methods to others
- leading a six sigma project team
- documenting and reporting six sigma project benefits in both statistical (defect reduction) and benefit/cost terms

Required knowledge

Required knowledge includes:

- charting, including:
  - Pareto charts
  - fishbone diagrams
  - PICK charts
  - run charts
  - scatter diagrams
- statistical principles and analysis, including:
  - confidence limits
  - analysis of variance
  - presentation data:
    - frequency distribution tables
    - histograms
  - measures of central tendency:
    - arithmetic mean
    - median
    - mode
  - measures of dispersion:
    - standard deviation
    - range
    - interquartile range
  - correlation and dependence
- acceptance criteria/confidence levels
- DMAIC methods
- failure mode and effects analysis (FMEA)

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- process mapping
- suppliers, inputs, process, outputs, customers (SIPOC) mapping
- types of data (e.g. discrete/continuous/attributes) and their use in six sigma

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • analyse statistical data and identify significant variations and other indicators for potential six sigma projects • apply DMAIC process individually • lead others in DMAIC process • review control strategies • confirm improvements.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation

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	• case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and

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	analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
DMAIC	DMAIC is a structured improvement methodology for existing business processes involving the following stages: • define • measure • analyse • improve • control and standardise
Define	Definition of the project to include: • completed, verified and validated as in process map • SIPOC diagram • discrepancies to current 'as is' process map • formation and briefing of project team • defining business case for project • problem statement • goal statement • project scope
Metrics	Metrics may include: • key measures/attributes • sampling schedule for project • defect rate

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Analyse	Analyse may include: • statistical analysis of data • root cause analysis • FMEA • use of various other problem solving/analysis tools
Improve	Improve may include: • generating and testing of improvements • selecting appropriate improvements
Control and standardise	Control and standardise may include: • documenting outcomes and procedures for standardisation • transferring ownership of improved process
Sampling schedule	Sampling schedule may include: • sampling frequency • type of sample/sample method • sample location/type • type of test/data to be collected
Process control strategy	Process control strategy may include: • degree of intervention/rules for resets • SPC tools to be used

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405060A Develop the application of enterprise control systems in an organisation

Modification History

New unit, superseding MSACMT660A Develop the application of enterprise systems in manufacturing - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to continuously modify and improve or develop new enterprise-wide information technology (IT) based control systems, such as Supervisory Control and Data Acquisition (SCADA), Enterprise Resource Planning (ERP), Materials Resource Planning (MRPII) and similar. Typically the development of such a system will be in liaison with an appropriate technical expert who may be an internal expert or an external consultant.

Application of the Unit

This unit applies to an individual responsible for the development and implementation of new systems or modifications/changes to the current system. While the individual might generate the ideas for change themselves and also undertake a significant part of the final implementation, they may also be working closely with an appropriate technical expert (such as the software system supplier) who may actually make the modifications.

This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information and consulting with stakeholders. Teamwork, problem solving, initiative and enterprise, and planning and organising skills are required to determine and implement effective enterprise systems and modifications. This unit also requires computer skills and aspects of self-management and learning to ensure feedback and new learning is integrated into system planning.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Monitor information and control needs of organisation	1.1	Check the use of current information
		1.2	Check the operation of current control systems
		1.3	Communicate regularly with key information users regarding any new or changed information control needs, including information needs from and to value stream
		1.4	Identify short comings in information and control provision
		1.5	Take appropriate action on information and control needs to meet organisational needs
2	Check the current system against organisation needs	2.1	Check the routine use of the system
		2.2	Check any system alarm or non-conformance notification and control operation
		2.3	Communicate regularly with key stakeholders about current system use and application
		2.4	Determine effect of non-conformance on enterprise system

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		2.5	Identify problems/issues
		2.6	Take appropriate action on problems and issues
3	Determine developments needed in a new or significantly modified system	3.1	Identify needs requiring a new system or development of modifications to the current system
		3.2	Draft scope, specifications and outcomes required
		3.3	Liaise with key stakeholders and relevant technical experts to refine scope, specifications and outcomes needed in new or modified system
		3.4	Agree final scope, specifications and outcomes
4	Develop system	4.1	Develop project plan
		4.2	Ensure ongoing consultation with all relevant stakeholders
		4.3	Manage development project
		4.4	Manage trialling of modified system
		4.5	Ensure modified system meets organisational requirements
5	Implement modified system	5.1	Liaise with all affected personnel
		5.2	Develop and agree an implementation strategy
		5.3	Ensure all personnel have required skills
		5.4	Implement modified system
		5.5	Monitor implementation and modify, as required

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

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Required skills

Required skills include:

- identifying organisation needs from enterprise control system, including:
  - critical features (e.g. occupational health and safety (OHS), regulatory compliance and emergency shutdown)
  - essential features and operation controls
  - access levels and access security
  - cost of installation and operation
  - interfaces (e.g. human-machine, machine-machine, and system-system, e.g. SCADA with financial control systems)
- correctly accessing and inputting information
- communicating with stakeholders on information and control requirements
- matching monitoring, control and reporting capability of system to organisation requirements
- analysing features of enterprise system and determining training needs
- solving problems to root cause
- monitoring trials and initial implementation of enterprise control system

Required knowledge

Required knowledge includes:

- capability of resource planning/SCADA systems, as appropriate
- information and control needs of organisation/process
- project management
- support/training/skill development mechanisms available for access by personnel

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • analyse organisation needs and match to enterprise control system features • determine critical features required in enterprise control system • modify system as a result of trials or changing needs.

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Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as SCADA software, ERP systems, MRP and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
SCADA	SCADA refers to: • a number of systems which automatically collect critical process data, perform required mathematical

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	manipulations on it and then make control decisions and/or give required information personnel for action In the continuous operations sector, the SCADA system is sometimes integrated into other sophisticated computer control systems, such as distributed control system (DCS) and indeed these systems do merge in advanced systems. These organisations may simply refer to their SCADA as the DCS or other similar term (such as the proprietary name of the computer system)
Resource planning	Planning software is a general term applied to a number of software systems which integrate a range of business information, such as: • finance • logistics maintenance and production It is frequently referred to by names, such as ERP and MRP/MRPII
Value stream	The value stream begins with the customer and includes all actions (both value adding and non value added) by both internal sections/departments and external organisations to meet a customer requirement. Depending on the operations and the customer requirement stages where value stream actions may occur include: • sales outlet/representative • information gathering, data analysis and research • product design • raw material sourcing • intermediate processing • final assembler/collation/preparation • support services (e.g. accounting, finance and legal) • storage and delivery to customer • after market support

Unit Sector(s)

Unit sector Competitive systems and practices

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Custom Content Section

Not applicable.

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MSS405061A Determine and establish information collection requirements and processes

Modification History

New unit, superseding MSACMT661A Determine and establish information collection requirements and processes - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to determine what information is needed to support decision-making in a competitive systems and practices environment and then to set about establishing required information collection systems. This would usually be done as part of a team and would require consultation with all key stakeholders.

Application of the Unit

This unit covers the determination of data needs and collection methods for an organisation or specific plant or process. This will typically be done in liaison with a wide range of people, each of whom will have their own specific information requirements. There will need to be balanced and interpreted into a workable set of data to be collected.

This unit is primarily focused on those decisions which are non-routine and so need specific collection of data, or for those decisions which are routine, the establishment of a routine data collection protocol to allow for the decisions to be made based on appropriate, reliable data.

This unit primarily requires the application of communication and problem solving skills associated with determining information requirements and processes of information collection. Initiative and enterprise, and planning and organising are also required to ensure information targets specific factors. This unit also requires aspects of self-management and learning to ensure feedback and new learning is integrated into the development of processes.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Analyse decisions to be made	1.1	Identify personnel to be included in the analysis process
		1.2	Determine the consequences of the decisions in liaison with relevant personnel
		1.3	Determine the variables which can be controlled
		1.4	Determine the variables which cannot be controlled
		1.5	Determine the consequences of a change in these variables in liaison with affected personnel
2	Define factors which cause variables to change	2.1	Identify factors which are able to be controlled
		2.2	Identify factors which are not able to be controlled
		2.3	Identify means of measuring these factors, or indicators for the values of these factors
		2.4	Compile a list of measurements/indicators required.
		2.5	Communicate with team members and involve them in development of factors and changes to ensure awareness and facilitate learning

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3	Develop data collection protocols	3.1	Determine methods of making measurements
		3.2	Determine methods of quantifying indicators
		3.3	Determine the benefit/cost of automated (or other) collection of data
4	Develop systems to produce required information	4.1	Identify user of information and their needs and abilities
		4.2	Determine data processing needs to produce required information
		4.3	Determine information distribution channels
		4.4	Determine skill development need for recipients of information
		4.5	Implement systems to produce information
		4.6	Monitor implementation and make adjustments, as required

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating and negotiating at all levels in the organisation and value stream and with individuals of different levels of literacy and numeracy
- negotiating with employees, suppliers and customers, where necessary, to achieve access to, or collection of, data
- undertaking self-directed problem solving and decision-making on issues of a broad and/or highly specialised nature and in a wide variety of contexts
- developing or sourcing indicators for factors not easily measured
- liaising with stakeholders on acceptable limits for benefits and costs in data collection procedures

Required knowledge

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Required knowledge includes:

- business needs of the organisation/section
- information needs of individuals within the organisation
- possible data available/potentially available to the organisation
- methods of collecting available data
- relationship between data available and information required
- methods of converting data into useful information
- methods of developing indicators for factors resistant to measurement

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • determine relevant data, including variables for decisions • determine factors and variables subject to control • develop strategies for data collection that deliver the greatest overall benefit • implement data collection systems.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment.

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	Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and

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	proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Variables	Variables for this unit are: • measurable inputs, outputs or characteristic of processes or operations that have no fixed quantitative value.
Factors	Factors include: • any variable that is a part of, contributes to, or leads to the quantum of another variable. Ideally factors themselves should be able to be measured. However, in some operations there may be factors that are resistant to objective measurement (e.g. creativity in design, customer colour preferences and life cycles for new products). In these cases indicators for the value of these factors may need to be developed (e.g. through surveys, approximations or experiments)
Decision	A decision may include: • a change, improvement, new/altered process or system which requires data in order to monitor it or

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	where data is required to make a decision regarding the selection of alternatives

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405070A Develop and manage sustainable energy practices

Modification History

New unit, superseding MSACMT670A Develop and manage sustainable energy practices - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to identify opportunities for, and make improvements in, sustainable energy practices in an organisation. Areas covered include efficient use of raw materials, management of waste, electricity conservation, heat conservation and management, water management, environment protection and environment obligations of enterprises.

Application of the Unit

This unit applies to an individual who is required to establish systems for improved energy practices in an organisation. The unit involves analysis of energy used in processes and operations and categorising the energy use according to lean principles. The unit covers categorising energy into necessary use and waste with the waste being further categorised into necessary waste and unnecessary waste. Strategies for eliminating or minimising energy waste are covered with benefit/cost analyses being required for strategies.

This unit primarily requires the application of communication and problem solving skills associated with collecting and analysing information. An ability to analyse energy use of technology or processes will be applied. Initiative and enterprise, and planning and organising are also required to develop plans for efficient energy use. This unit also requires aspects of self-management and learning to ensure feedback and new learning is integrated into the development of processes.

Where the quantum of energy used is not easily available or a formal calculation of energy use is required through an energy balancing calculation (e.g. for regulatory purposes) the unit *MSS015011A Conduct a sustainability energy audit* may also be required.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Analyse energy use	1.1	Identify all energy consuming processes
		1.2	Determine quantity and nature of energy consumed
		1.3	Analyse energy consumed and generated in different parts of the process
		1.4	Determine source of energy consumed in process
2	Develop energy conservation plans	2.1	Determine the efficiency of use of energy by all energy consuming processes
		2.2	Determine causes of low efficiency of use
		2.3	Develop plans for increasing the efficiency of energy use
		2.4	Determine benefit/cost of plans
3	Develop energy trading plans	3.1	Compare energy generating activities with energy consuming activities
		3.2	Determine feasibility of energy consuming activities using energy generated by other activities

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		3.3	Develop plans for energy trading
		3.4	Determine benefit/cost of plans
4	Investigate alternative sources of energy	4.1	Develop a specification for energy required
		4.2	Identify a range of sources for that energy
		4.3	Determine benefit/cost for alternative energy sources
5	Develop plans for more efficient energy use	5.1	Compare benefit/costs for different alternatives developed
		5.2	Rank proposals based on benefit/cost compare to limited resources
		5.3	Check proposals meet regulatory requirements
		5.4	Recommend proposals for improving energy efficiency
6	Implement selected plans	6.1	Liaise with relevant people to implement energy efficiency plans
		6.2	Follow through to ensure implementation occurs
		6.3	Monitor implementation and make adjustments, as required
		6.4	Check new energy usage to ensure improvements have occurred

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- using common units, symbols and formulae common in energy-related calculations
- applying mathematics

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- communicating with a variety of groups and individuals using different media
- solving complex problems individually and as part of a team
- reviewing range of existing data for suitability and determining where new data gathering is required
- planning and organising complex whole of organisation activities relating to energy use, including objectives, timelines, implementation procedures and monitoring strategy
- determining where energy balancing techniques are required
- accessing manufacturers' data and other sources of energy consumption for individual equipment and processes
- mapping processes and energy flows
- calculating, manipulating and interpreting numerical data
- ranking energy consumption and waste for area, sites or processes
- calculating the efficiency of use of energy by equipment and processes
- consulting with technical and operative staff on possible non-obvious energy wastes
- consulting and negotiating with stakeholders on implementation process for sustainability improvement

Required knowledge

Required knowledge includes:

- types and sources of energy
- methods of analysing energy efficiency for different types of energy
- methods of converting energy values from one form to another
- alternative sources of energy
- principles of energy efficiency
- relevant regulatory/legislative requirements
- energy trading schemes and procedures
- organisation and process needs for energy

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • gather appropriate data to allow energy analyses • categorise energy use into necessary use and waste • develop options for energy reduction including

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	presenting of alternatives and benefit/cost analyses • develop strategies and plans for energy use and monitor implementation.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise

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	• the work organisation, culture, regulatory environment and the industry sector
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Within operations, categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items • activities which do not yield any benefit to the organisation or any benefit to the organisations customers
Necessary waste	Necessary waste is: • any activity or cost which does not contribute directly to customer benefit/feature in the product, and which cannot be avoided (e.g. regulatory compliance and fixed costs). Necessary waste cannot be eliminated but should be managed
Unnecessary waste	Unnecessary waste is: • any activity or cost which does not contribute directly to customer benefit/features in the product and can be avoided. Unnecessary waste should be eliminated as quickly as practical
Energy	Energy includes: • all sources of energy used by the process be it electricity, gas or mobile transport fuel The uses of the energy will also be potentially wide and include: • heating and cooling • moving materials (e.g. pumps and conveyors) • modifying materials (e.g. cutting, forming, weaving, knitting, reacting, moulding, extruding and mixing) • generating pressure/vacuum or providing motive power for equipment and transport
Energy trading	Energy trading means both formal trading where the organisation investigates alternatives to:

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	• the buying of energy through alternative suppliers and tender processes • selling of excess energy produced by the organisation to energy companies or other producers and • internal trading of excess energy from one area to an energy consuming area elsewhere in the organisation

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405075A Facilitate the development of a new product

Modification History

Release 2 - Content error in Range and Evidence Guide corrected. Prerequisite unit code corrected - MSS404052A

Release 1 - New unit, superseding MSACMT675A Facilitate the development of a new product* - Equivalent

* New prerequisite *MSS404052A Apply statistics to operational processes* superseding MSACMT452A Apply statistics to processes in manufacturing

Unit Descriptor

This unit of competency covers the skills and knowledge required to facilitate the development of a new or evolutionary product within an existing range of products and encompasses design for manufacture, determining the process capability and the facilitation of its initial production.

Application of the Unit

This competency applies to an individual responsible for the development of a new product. The unit assumes an initial product design has been prepared by a designer and also assumes a working knowledge of all main processes and materials so that an informed choice can be made between them. The person will normally be a manager or technical expert and be required to work closely with a range of other management and operations personnel.

The unit requires balancing the business and technical sides of the new product and would typically be done as part of a cross-functional team. This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information and consulting with stakeholders. Teamwork, problem solving, initiative and enterprise, and planning and organising are required to facilitate the development of a new product. This unit also requires aspects of self-management and learning to ensure feedback and new learning is integrated into competitive systems and practices.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS404052A Apply statistics to operational processes

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Confirm design brief of new product in consultation with relevant people	1.1	Review product design with customer and other key stakeholders and agree on technical specification, aesthetic requirements, timelines, cost and other market requirements
		1.2	Determine any regulatory, industry code/intellectual property requirements for product
		1.3	Identify any required tooling, process or equipment needs
		1.4	Confirm design brief, including relevant drawings, to meet needs
		1.5	Determine design brief conforms to organisation objectives and capability
		1.6	Obtain approval on total design brief from all relevant personnel
2	Determine material requirements for product	2.1	Select appropriate materials or combination of materials/ components in liaison with key stakeholders
		2.2	Determine material/component testing and evaluation regime required to meet product end use requirements,

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			including regulatory/industry code requirements
		2.3	Arrange for testing and evaluation of trial materials/ components
		2.4	Guide material trial process and interpret material trial results
		2.5	Determine final materials/components specifications and details of value chain
3	Determine process requirements for product	3.1	Select appropriate process to make product in liaison with key stakeholders and based on relevant factors
		3.2	Determine any special process/equipment requirements for this product
		3.3	Communicate with production personnel to determine any concerns and/or training or other needs
		3.4	Adjust the design, as required, to satisfy customer and production needs
4	Ensure process needs for new product have been met	4.1	Liaise with equipment design/procurement personnel
		4.2	Interpret hardware specifications and ensure they are appropriate for the job required
		4.3	Liaise with process personnel to ensure appropriate draft procedures for new product have been developed
		4.4	Validate product cost and design meets organisation requirements and capability
5	Trial new product through the process	5.1	Design trialing procedure to deliver required information
		5.2	Liaise with relevant stakeholders
		5.3	Ensure health safety and environment (HSE) requirements are observed
		5.4	Coordinate the trialling of the new product
		5.5	Interpret product trial results and guide product trial

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			process
		5.6	Tune process to optimise production of new product
6	Determine process capability	6.1	Plot appropriate statistical process control charts
		6.2	Determine confidence limits
		6.3	Compare confidence limits with product specification
7	Coordinate product trials	7.1	Determine product testing and evaluation regime required to meet end use requirements, including regulatory/industry code requirements
		7.2	Arrange for testing and evaluation of trial product/prototype
		7.3	Interpret product trial results and guide product trial process
		7.4	Determine final product specification in liaison with key stakeholders
		7.5	Make required changes to materials, process and equipment
8	Implement standard procedures for new product	8.1	Monitor initial production and, in liaison with appropriate team members, adjust process, conditions and materials to ensure the product and process outcomes conform to customer, regulatory and organisation requirements
		8.2	Ensure process specifications are updated and reflect the optimised operation developed
		8.3	Ensure standard operating procedures are correct for the new product
		8.4	Ensure equipment and other hardware records are updated to reflect additions/changes
		8.5	Ensure project records are complete and all required reports have been completed and submitted

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8.6 Archive records according to company procedure

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- selecting and justifying the selection of:
  - type of material/material specification
  - appropriate process for a range of product/market applications
  - material and product testing procedures
- applying theoretical principles to predict:
  - properties of product based on materials selected
- identifying effects of processes and processing on the final properties of the product mathematically determine:
  - product cost estimates
  - process time
  - cost/benefit to organisation of new product
- communicating at all levels in the organisation and value stream and to audiences of different levels of literacy and numeracy
- interpreting and making recommendations based on:
  - field test results
  - market analysis data
  - trialling data
  - organisation objectives and business plan
  - equipment and operations capacity

Required knowledge

Required knowledge includes:

- materials, equipment and process sufficient to choose an appropriate combination of materials and process to achieve the end use function of the product
- enterprise procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of their ability to: • ensure the development of a new product meets general organisation guidelines and objectives • liaise with the required people • optimise the process for the new product at the completion of the development phase • assess materials and components characteristics required in a design including material grades and properties and the effects of processing on materials and components • use trial outcomes to determine standard procedures for manufacture and/or operation of new product.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of

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	contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S

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	• continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector

Organisation objectives and requirements	Organisation objectives and requirements may include:
	• Board or management guidelines on:
	  • cost/profit requirements for new products (e.g. minimum return and capital expenditure limits)
	  • encouragement/discouragement of different types of products (e.g. on sustainability, ethical or other non-individual customer related criteria)
	• potential or actual capacity conflicts with other customers or product/process activities
	• activities that require/may require community consultation (e.g. on noise or other environmental grounds)

Tools and equipment	Tools and equipment may include: • understanding of use of all standard processing equipment • relevant personal protective equipment
Typical regulatory requirements	Typical regulatory requirements may include: • occupational health and safety (OHS) • environmental regulations • structural codes • product/industry specific requirements
Typical problems	Typical problems may include: • defining product end-use requirements in terms

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	meaningful to the product design and manufacture • matching suitable materials and processes to the product needs and company expertise and facilities • matching (and improving) process capability to product tolerances
Relevant factors	Relevant factors may include: • type of material • dimensional precision of product • length of run/number of products • required aesthetics • size and complexity of product • available capital funding • process equipment available • HSE factors

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405081A Develop a proactive maintenance strategy

Modification History

New unit, superseding MSACMT681A Develop a proactive maintenance strategy - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to develop and implement a proactive maintenance strategy for an organisation. The unit recognises that there are a number of predictive or proactive maintenance strategies, such as total productive maintenance (TPM) and reliability centred maintenance (RCM).

Application of the Unit

This unit applies to an individual responsible for developing a proactive maintenance strategy for an organisation. Typically the organisation will also be implementing other competitive systems and practices. The unit applies to the selection of appropriate strategies, initial development and implementation as well as application of the strategies to new areas and the improvement of operation in existing areas. This would typically be done in a team environment and in consultation with all key stakeholders.

This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information and consulting with stakeholders. Teamwork, problem solving, initiative and enterprise, and planning and organising are required to develop and implement a predictive maintenance strategy. Strategies will incorporate the maintenance requirements of relevant technologies. This unit also requires aspects of self-management and learning to ensure feedback and new learning is integrated into maintenance strategies.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Determine appropriate analytical techniques	1.1	Liaise with key stakeholders to determine objectives of maintenance strategy
		1.2	Examine current maintenance situation to determine major areas requiring improvement
		1.3	Compare possible strategies, techniques and tools against organisation needs
		1.4	Select possible strategies, techniques and tools
		1.5	Confirm selected strategies, techniques and tools with key stakeholders
2	Develop reliability strategies	2.1	Select preferred maintenance strategy
		2.2	Examine and adapt strategy to organisation needs and priorities
		2.3	Examine and adapt techniques and tools required to implement strategy
		2.4	Liaise with key stakeholders to develop an implementation plan
		2.5	Identify key information and performance indicators required
3	Implement strategy	3.1	Identify data collection required
		3.2	Identify hardware and other resources required

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		3.3	Identify skill needs required in consultation with key stakeholders
		3.4	Ensure all resources/training are available
		3.5	Implement strategy
4	Monitor implementation of strategy	4.1	Compare information/performance indicators with desired levels
		4.2	Liaise with key stakeholders regarding strategy issues
		4.3	Identify areas requiring adjustment
		4.4	Make required adjustments

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- communicating with others using a variety of media and techniques
- adapting personal communication strategy to different levels of literacy and numeracy in target individuals and groups
- working in a team
- analysing quantitative and qualitative information to determine proactive maintenance strategy options
- solving problems to root cause
- applying basic arithmetic and statistical techniques
- planning complex strategies, including consideration of timelines, resources, benefit/cost, implementation requirements, and monitoring and adjustment considerations
- reading and interpreting engineering specifications, drawings and charts
- using information system terminals and computers
- prioritising options, including reasons and recommendations
- recording data

Required knowledge

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Required knowledge includes:

- characteristics and strengths of different types of strategies, techniques and tools, such as:
  - TPM
  - RCM
  - mean time between failure (MBTF)
  - failure mode effects analysis (FMEA)
  - condition monitoring
  - root cause analysis (RCA)
- holistic costs of different strategies combining cost of maintenance with costs of lost production, sales, and so on, as relevant to the organisation
- business goals sufficient to match the strategy to the business needs
- strategic thinking and its application to proactive maintenance
- principles of process equipment and how to improve its reliability
- resources required and how to obtain them

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • consider a variety of proactive maintenance strategies for suitability to an organisation • consult operators, maintenance, management and other stakeholders in decisions on proactive maintenance strategies • implement selected strategies • monitor performance to selected indicators and make improvements to selected proactive maintenance strategies.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented

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	changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning for appropriate portions • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
OEE	OEE is the combination of the main factors causing loss of productive capacity from equipment/plant and is: *OEE = availability x performance x quality rate* where: • availability takes into account losses due to breakdown, set-up and adjustments • performance takes into account losses due to minor

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	stoppages, reduced speed and idling • quality rate takes into account losses due to rejects, reworks and start-up waste
MTBF	MTBF is one key measure of the effectiveness of a maintenance procedure, and is an indicator as to whether root causes are being found and resolved. If MTBF is reducing, then it is an indicator that the maintenance regime is failing. There are many possible causes of any problem. Eliminating some will have no impact, others will ameliorate the problem. However, elimination of the root cause will eliminate the problem. There should only be one root cause for any problem and so the analysis should continue until this one cause is found. Elimination of the root cause permanently eliminates the problem. Depending on the equipment, operations and procedures of the organisation, alternative statistical records of maintenance and maintenance-related events may be substituted for MTBF providing they relate strategies for improving OEE.
FMEA	FMEA is a systematic approach that identifies potential failure modes in a system, product, or operations/assembly operation caused by either design or operations/assembly process deficiencies. It also identifies critical or significant design or process characteristics that require special controls to prevent or detect failure modes. FMEA is a tool used to prevent problems from occurring. Some industry sectors have highly adapted forms of FMEA and may practice traditional FMEA in say their routine maintenance while using another technique, such as Hazard and Operability Studies (HAZOP) for design and modification. HAZOP is a form of FMEA which has been practiced by the process industries for over 30 years and examines the implications of changes in process conditions to process stability.
Condition monitoring	Condition monitoring is used to describe the process of analysing the implications of condition monitoring data for proactive maintenance whether it be obtained from non destructive testing (NDT) reports, visual assessment by experts, diagnostic reports obtained from SCADA or other enterprise or equipment software and product or process quality analyses. It does not require the actual

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	undertaking of the NDT or condition monitoring assessment or test. If this is required appropriate units from other Training Packages will be required.

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405082A Adapt a proactive maintenance strategy to the process operations sector

Modification History

New unit, superseding MSACMT682A Adapt a proactive maintenance strategy to the process manufacturing sector* - Equivalent

* New prerequisite *MSS405081A Develop a proactive maintenance strategy* superseding MSACMT681A Develop a proactive maintenance strategy

Unit Descriptor

This unit of competency covers the skills and knowledge required to develop and apply a proactive maintenance strategy for continuous manufacturing processes which may also be major hazard facilities or similar.

Application of the Unit

This unit applies to an individual in a continuous manufacturing sector, such as chemical, hydrocarbons and refining, smelting and cement, which is seeking to improve the efficiency and reliability of equipment. Typically such an organisation will also be engaged in implementing competitive systems and practices. As continuous manufacturers, such as the chemical, hydrocarbons and refining sectors, are often also major hazard facilities this will influence the proactive maintenance choices which need to be made.

The unit covers the selection of appropriate strategies, techniques and tools and the adapting of them to the organisations needs. It also covers the application of the strategies to new areas and the improvement of operation in existing areas. This would typically be done in a team environment and in consultation with all key stakeholders.

This unit requires the application of skills associated with problem solving, initiative, enterprise, planning and organising in order to adapt a proactive maintenance strategy to meet specific needs of the enterprise. This work is done in the context of using computer technology and also requires aspects of self-management and learning to ensure improvement of own performance.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS405081A Develop a proactive maintenance strategy

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Interpret proactive maintenance strategy	1.1	Analyse proactive maintenance strategy
		1.2	Identify areas which may conflict with hazard or operations requirements
		1.3	Analyse data arising from incident reports (and similar) for maintenance implications
		1.4	Compile hazard control implications for proactive maintenance strategy
2	Interpret hazard information	2.1	Analyse Hazard and Operability Studies (HAZOP) (or similar) data for maintenance implications
		2.2	Analyse safety case (or similar) data for maintenance implications
		2.3	Analyse data arising from incident reports (and similar) for maintenance implications
		2.4	Compile hazard control implications for proactive maintenance strategy

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3	Identify shutdown cycle requirements	3.1	Determine when the next shutdown is due and the expected time between shutdowns
		3.2	Identify plant items/maintenance activities which can only be completed during a shutdown
		3.3	Identify critical conditions which must not be breached in order to maintain plant reliability until shutdown
		3.4	Compile shutdown cycle requirements for proactive maintenance strategy
4	Identify maintenance requirements of ancillary equipment	4.1	Identify proactive maintenance requirements of ancillary equipment
		4.2	Identify maintenance which can only be done when the plant is shut down
		4.3	Compile ancillary equipment requirements for proactive maintenance strategy
5	Adapt proactive maintenance strategy	5.1	Compare identified requirements to the proactive maintenance strategy
		5.2	Negotiate a proactive maintenance strategy which meets these requirements
		5.3	Involve team members in relating identified problems and opportunities for improvement to the maintenance strategy, and involve them in developing any required changes to ensure awareness, learning and commitment
		5.4	Monitor the implementation of the strategy to ensure the identified requirements are met
		5.5	Make required adjustments and arrange for strategy review

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

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Required skills

Required skills include:

- communicating with others using a variety of media and techniques
- adapting personal communication strategy to different levels of literacy and numeracy in target individuals and groups
- working in a team
- analysing quantitative and qualitative information to determine proactive maintenance strategy options
- applying a structured approach to integrating hazard management considerations to the development of a proactive maintenance strategy
- solving problems to root cause
- applying basic mathematical and statistical techniques
- planning complex strategies, including consideration of timelines, resources, benefit/cost, implementation requirements, and monitoring and adjustment considerations
- reading and interpreting engineering specifications, drawings and charts
- using information system terminals and computers
- prioritising options, including reasons and recommendations
- recording data

Required knowledge

Required knowledge includes:

- continuous manufacturing equipment and products of the organisation
- start-up, shutdown and isolation considerations for the organisation
- skills required by operators and maintenance personnel to achieve effective proactive maintenance strategy implementation
- characteristics and strengths of different types of strategies, techniques and tools, such as:
  - total preventative maintenance/total productive maintenance (TPM)
  - reliability centred maintenance (RCM)
  - mean time between failure (MTBF)
  - failure mode and effects analysis (FMEA)
  - condition monitoring
  - root cause analysis (RCA)
- holistic costs of different strategies combining cost of maintenance with costs of lost production, sales, and so on, as relevant to the organisation
- business goals sufficient to match the strategy to the business needs
- strategic thinking and its application to proactive maintenance
- principles of process equipment and how to improve its reliability
- resources required and how to obtain them

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • analyse hazards and risks and determine implications for proactive maintenance strategies • consider a variety of proactive maintenance strategies for suitability to an organisation • consult operators, maintenance, management and other stakeholders in decisions on proactive maintenance strategies • monitor implementation of selected proactive maintenance strategies and make appropriate adjustments.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on)

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	• targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S

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	• continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Safety case	Safety case refers to: • a formal requirement of major hazard facilities in order to procure an operating licence
Shutdown	Shutdown refers to: • the regulatory shutdown of the plant for safety inspections (this is also the only time major maintenance can be done)
Ancillary equipment	Ancillary equipment includes other plant, such as: • boilers • utilities • plants • waste treatment and hazard control equipment (e.g. fire ring mains, fire monitors, steam curtains, gas (or other loss of containment) monitors, blast protection and flare stacks)
TPM	TPM includes: • an application of total quality management to maintenance with the intention of increasing reliability, getting it right first time and increasing OEE
RCM	RCM includes: • moving maintenance from reactive, or even planned/programmed towards a focus on uptime and

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	OEE
RCA	RCA is a structured problem solving technique. Typically there are many possible causes of any problem. Eliminating some will have no impact, others will ameliorate the problem. However, elimination of the root cause will eliminate the problem. There should only be one root cause for any problem and so the analysis should continue until this one cause is found. Elimination of the root cause permanently eliminates the problem.
MTBF	MTBF is one key measure of the effectiveness of a maintenance procedure, and is an indicator as to whether root causes are being found and resolved. If MTBF is reducing, then it is an indicator that the maintenance regime is failing.
FMEA	FMEA is a systematic approach that identifies potential failure modes in a system, product, or operations/assembly operation caused by either design or operations/assembly process deficiencies. It also identifies critical or significant design or process characteristics that require special controls to prevent or detect failure modes. FMEA is a tool used to prevent problems from occurring. Some industry sectors have highly adapted forms of FMEA and may practice traditional FMEA in say their routine maintenance while using another technique, such as HAZOP, for design and modification.
Uptime	Uptime refers to: • the overall availability of the plant (it is the inverse of downtime) or the unavailability of the plant. Ideal uptime is 100%
OEE	OEE is the combination of the main factors causing loss of productive capacity from equipment/plant and is where: *OEE = availability x performance x quality rate* • availability takes into account losses due to breakdown, set-up and adjustments • performance takes into account losses due to minor stoppages, reduced speed and idling • quality rate takes into account t losses due to rejects, reworks and start-up waste
Condition monitoring	Condition monitoring involves often quite sophisticated

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	monitoring of equipment, including such things as: • vibration monitoring • instrumental analysis of lubricating oil, and so on to determine the current state of the equipment, monitor the change in this condition and predict when it needs servicing/maintenance to maintain reliability
HAZOP	HAZOP is a form of FMEA which has been practiced by the process industries for over 30 years and examines the implications of changes in process conditions to process stability.

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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MSS405083A Adapt a proactive maintenance strategy for a seasonal or cyclical business

Modification History

New unit, superseding MSACMT683A Adapt a proactive maintenance strategy for a seasonal or cyclical manufacturing operation* - Equivalent

* New prerequisite *MSS405081A Develop a proactive maintenance strategy* superseding MSACMT681A Develop a proactive maintenance strategy

Unit Descriptor

This unit of competency covers the skills and knowledge required to develop a standard proactive maintenance strategy for a seasonal or cyclical operational processes or similar.

Application of the Unit

This unit applies to an individual responsible for developing a proactive maintenance strategy for an organisation that operates seasonal/cyclical plant and also adopts proactive maintenance strategies. The organisation will also usually be implementing other competitive systems and practices. Typical applications include many food processing enterprises, cotton ginning, sugar refineries, and so on. The unit covers changing the normal priority of some of the choices which need to be made in implementing a proactive maintenance strategy. The unit applies to the selection of appropriate strategies, initial development and implementation will need to be managed as well as application of the strategies to new areas and the improvement of operation in existing areas.

This would typically be done in a team environment and in consultation with all key stakeholders.

This unit requires the application of skills associated with problem solving, initiative, enterprise, planning and organising in order to adapt a proactive maintenance strategy to meet seasonal or cyclical needs of the enterprise. This work is done in the context of using computer technology and also requires aspects of self-management and learning to ensure improvement of own performance.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS405081A Develop a proactive maintenance strategy

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Interpret proactive maintenance strategy	1.1	Analyse proactive maintenance strategy
		1.2	Identify areas which may conflict with cyclical requirements
		1.3	Identify critical conditions which must be met in order to maintain plant reliability until season end
		1.4	Compile cycle requirements for proactive maintenance strategy
2	Identify cyclical requirements of the process	2.1	Establish when the season finishes and the expected cycle duration
		2.2	Identify plant items and maintenance activities which production imperatives dictate can only be completed after season end
		2.3	Identify critical conditions which must be met in order to maintain plant reliability until season end
		2.4	Compile cycle requirements for proactive maintenance strategy

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3	Identify maintenance requirements of ancillary equipment	3.1	Identify proactive maintenance requirements of ancillary equipment
		3.2	Identify maintenance which can only be done at season end
		3.3	Compile ancillary equipment requirements for proactive maintenance strategy
4	Identify maintenance requirements during season	4.1	Identify critical maintenance activities which must be done during season
		4.2	Negotiate conflicts with seasonal or cyclical processing requirements
		4.3	Compile proactive maintenance strategy requirements during season
5	Adapt proactive maintenance strategy	5.1	Compare identified requirements to the proactive maintenance strategy
		5.2	Negotiate a proactive maintenance strategy which meets these requirements
		5.3	Involve team members in relating identified problems and opportunities for improvement to the maintenance strategy, and involve them in developing any required changes to ensure awareness, learning and commitment
		5.4	Monitor the implementation of the strategy to ensure the identified requirements are met
		5.5	Make required adjustments and arrange review schedule

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- considering the impact of seasonal and cyclical production requirements on equipment

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availability requirements
- prioritising maintenance activities critical to production
- communicating with others using a variety of media and techniques
- adapting personal communication strategy to different levels of literacy and numeracy in target individuals and groups
- working in a team
- analysing quantitative and qualitative information to determine proactive maintenance strategy options
- solving problems to root cause
- applying basic arithmetic and statistical techniques
- planning complex strategies, including consideration of timelines, resources, benefit/cost, implementation requirements, and monitoring and adjustment considerations
- reading and interpreting engineering specifications, drawings and charts
- using information system terminals and computers
- prioritising options, including reasons and recommendations
- recording data

Required knowledge

Required knowledge includes:

- processing equipment and products of the organisation
- start-up, shutdown and isolation considerations for the organisation
- skills required by operators and maintenance personnel to achieve effective proactive maintenance strategy implementation
- characteristics and strengths of different types of strategies, techniques and tools, such as:
  - total productive maintenance (TPM)
  - reliability centred maintenance (RCM)
  - mean time between failure (MBTF
  - failure mode effects analysis (FMEA)
  - condition monitoring
  - root cause analysis (RCA)
- holistic costs of different strategies combining cost of maintenance with costs of lost production, sales, and so on, as relevant to the organisation
- business goals sufficient to match the strategy to the business needs
- strategic thinking and its application to proactive maintenance
- principles of process equipment and how to improve its reliability
- resources required and how to obtain them

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • analyse the equipment availability requirements of a seasonal or cyclical operation • consider a variety of proactive maintenance strategies for suitability to a seasonal or cyclical operation • consult operators, maintenance, management and other stakeholders in decisions on proactive maintenance strategies • monitor the implementation of selected proactive maintenance strategies and make required adjustments.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues

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	(third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz)

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	• cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Critical conditions	Critical conditions are those factors which must be undertaken or determined in order to maintain plant reliability during processing season. These may include: • maximum load factors • lubrication schedules • correct operating temperatures • cleaning and waste removal schedules • equipment inspection and test schedules • development of standard operating procedures and training of operators
Ancillary equipment	Ancillary equipment includes other plant, such as: • boilers • utilities • plants • waste treatment and hazard control equipment (e.g. fire ring mains, fire monitors, steam curtains, gas (or other loss of containment) monitors, blast protection and flare stacks)
TPM	TPM refers to: • an application of total quality management to maintenance with the intention of increasing reliability, getting it right first time and increasing OEE
RCM	RCM includes: • moving maintenance from reactive, or even planned/programmed towards a focus on uptime and

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	OEE
RCA	RCA is a structured problem solving technique. Typically there are many possible causes of any problem. Eliminating some will have no impact, others will ameliorate the problem. However, elimination of the root cause will eliminate the problem. There should only be one root cause for any problem and so the analysis should continue until this one cause is found. Elimination of the root cause permanently eliminates the problem.
MBTF	MBTF is one key measure of the effectiveness of a maintenance procedure, and is an indicator as to whether root causes are being found and resolved. If MBTF is reducing, then it is an indicator that the maintenance regime is failing.
FMEA	FMEA is a systematic approach that identifies potential failure modes in a system, product, or operations/assembly operation caused by either design or operations/assembly process deficiencies. It also identifies critical or significant design or process characteristics that require special controls to prevent or detect failure modes. FMEA is a tool used to prevent problems from occurring. Some industry sectors have highly adapted forms of FMEA and may practice traditional FMEA in say their routine maintenance while using another technique, such as Hazard and Operability Studies (HAZOP) for design and modification.
Uptime	Uptime refers to: • the overall availability of the plant (it is the inverse of downtime) or the unavailability of the plant. Ideal uptime is 100%
OEE	OEE is the combination of the main factors causing loss of productive capacity from equipment/plant and is where: *OEE = availability x performance x quality rate* • availability takes into account losses due to breakdown, set-up and adjustments • performance takes into account losses due to minor stoppages, reduced speed and idling • quality rate takes into account t losses due to rejects, reworks and start-up waste
Condition monitoring	Condition monitoring involves often quite sophisticated

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	monitoring of equipment, including such things as: • vibration monitoring • instrumental analysis of lubricating oil, and so on, to determine the current state of the equipment, monitor the change in this condition and predict when it needs servicing/maintenance to maintain reliability
HAZOP	HAZOP is a form of FMEA which has been practiced by the process industries for over 30 years and examines the implications of changes in process conditions to process stability.

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.

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PMAOHS310B Investigate incidents

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency unit refers to the investigation of incidents that occurred at the workplace. These incidents can vary from large to small, completely internal or partially externally coordinated. They include, but are not limited to, all types of emergencies, fires, OHS and/or environmental incidents.

Application of the Unit

Application of the unit	In a typical scenario, minor incidents which are subject to internal investigation will be conducted by the plant operator/technician, and for a more major investigation, or one subject to external investigation, he/she will assist with the investigation and/or undertake identified parts of the investigation. The exact definition of the scope of responsibility will depend on company policy, as will the level of the person undertaking these investigations. These investigations will be in accordance with company procedures for such investigations which will be consistent with any relevant regulations.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Monitor and review emergency situation	1.1. Undertake site inspections of incident scene 1.2. Communicate with relevant personnel regarding specific aspects of the emergency situation 1.3. Monitor corrective action procedures 1.4. Communicate changes to the situation to appropriate personnel.
2. Record investigation process and results as appropriate	2.1. Establish and secure boundaries of the incident scene to prevent contamination of prospective evidence/exhibits 2.2. Identify and interview persons relevant to the incident 2.3. Identify and record evidence/exhibits at the scene prior to examination to ensure continuity 2.4. Assess relevant information, documentation and evidence/exhibits 2.5. Determine point of origin and most likely cause of incident of the emergency 2.6. Determine risk factors affecting the emergency 2.7. Identify and analyse a range of other possible causes 2.8. Identify and utilise support services to investigate the incident scene 2.9. Process, record and communicate information/evidence/ exhibits, forms and documents to appropriate personnel following enterprise policies and procedures.
3. Make suggestions to	3.1. Identify and assess tactical factors and resulting priorities

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ELEMENT	PERFORMANCE CRITERIA
improve handling of emergency situation	occurring during the emergency 3.2. Formulate appropriate suggestions to improve handling of similar emergency situation based upon information available 3.3. Identify obvious problems in related plant area and make an appropriate contribution to their solution.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.

Required skills

Competence includes the ability to apply and describe or explain:

- factors affecting fire behaviour
- characteristics of fire and fuel types
- security of an incident scene
- examination of an incident scene
- collection of physical evidence
- workplace documentation and recording systems
- use of personal protective equipment
- liaison techniques with third parties
- workplace procedures and work instructions
- company policies regarding health and safety and environment
- hazard identification, assessment and control of risk
- basic risk assessment of workplace jobs/tasks
- environmental impacts likely to arise from activities
- measures for eliminating and/or reducing impacts on the environment.

Required knowledge

Knowledge and underpinning skills are required in:

- communication (listening, questioning) and negotiation in questioning witnesses
- analytical and decision making skills
- problem solving skills in responding to a range of emergency situations
- exhibit handling and preserving continuity of evidence
- witness management, in particular demonstration of ethical behaviour and cultural awareness.

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REQUIRED SKILLS AND KNOWLEDGE
Knowledge and understanding of the investigation of incidents sufficient to recognise and assess causes of emergency situations and then to determine improvements to the actual response within the scope and level of the IR responsibilities and competencies. A demonstrated working knowledge and application of the company-specific work organisations and workflow would be highly regarded. An ability to coordinate own work and the work of other team members is also regarded as a component of this unit of competency.

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action within the scope and level of their

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EVIDENCE GUIDE	
	responsibilities and competencies. Consistent performance should be demonstrated. In particular look to see that wherever possible: • the scene is secure and evidence is preserved • evidence is collected in accordance with legislative requirements • point of origin and most likely cause of incident is determined • a range of other possible causes can be identified and analysed • obvious problems in related plant areas are recognised and an appropriate contribution made to their solution • emergency reporting procedures are understood and followed. These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and extreme situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities (eg HAZOP) and similar sources.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

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Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	Job safety and environment analysis will be conducted in accordance with required company procedures and policies. This competency covers process manufacturing plants which may involve workplace hazards such as: • chemicals and hazardous materials • gases and liquids under pressure • moving machinery • materials handling • working at heights, in restricted or confined spaces, or environments subjected to heat, noise, dusts or vapours.
Incidents/emergencies	Incidents/emergencies may include, but are not limited to: • accidents • fire • chemical or oil spills • gas leak or vapour emission • utilities failure • bomb scares • OHS incidents • environmental incidents.
Enterprise policies and procedures	Enterprise policies and procedures include those which directly or indirectly cover emergency situations, such as: • emergency, fire and accident procedures • hazard policies and procedures • standard operating procedures (SOPs) • safety procedures • work instructions • personal protective clothing and equipment procedures.
Evidence gained	Evidence gained as a result of investigations may include: • video tapes

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RANGE STATEMENT	
	• audio tapes • drawings • photographs • plans • manifests • relevant documents • personal notes • physical evidence/materials • debris • soil.
Support services	Support services may include incident scene specialists: • pathologists • forensic investigators • coroner • government medical officers • interpreters • technical services • legal officers • undertakers • forensic accountants • information technology consultants • document examiners • handwriting experts • financial organisations • external law enforcement agencies.
Interview strategies	Interview strategies may vary but require consideration of: • location • timing • method (direct questioning, empathetic questioning) • strategies for developing rapport • who is being interviewed • exclusion of leading questions • avoidance of cross-examination.
Legal and policy requirements	Legal and policy requirements differ according to the status of the person being interviewed. Such requirements may include: • the presence of a solicitor, independent person, family member or interpreter • special consideration that applies disabled, child, parent, age, gender, ethnicity and race.

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RANGE STATEMENT	
Post investigation documentation	Post investigation documentation may include: • statements • proformas • photographs • tape recordings.

Designated personnel	Designated personnel for incident investigation referrals may include:
	• employer
	• personnel directly involved in responding to the incident, including:
	  • first response personnel
	  • emergency response team members
	  • emergency team leader(s)
	  • First Aid officers
	• other personnel with emergency team leader responsibilities.

Health, safety and environment (HSE)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

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Co-requisite units

Co-requisite units	

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PMAOHS420B Develop First Aid procedures and manage resources

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency unit encompasses the management of procedure development and the implementation of effective systems for human and physical resources to ensure that First Aid can be effectively and efficiently provided in the workplace.

Application of the Unit

Application of the unit	

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Develop effective organizational systems	1.1. Coordinate participative processes to identify and agree on outcomes 1.2. Initiate processes to plan, implement and control systems to achieve identified outcomes 1.3. Implement/develop policies and procedures consistent with procedures 1.4. Develop and maintain processes for effective conduct of First Aid responsibilities 1.5. Distribute changes in policy and procedures to relevant personnel using appropriate communication channels 1.6. Undertake review of procedures/policy, and report recommendations as required.
2. Implement effective First Aid training and practice.	2.1. Maintain links with First Aid bodies and professionals and clinical organisations/bodies 2.2. Maintain currency of First Aid and personal qualifications in accordance with industry and organisational requirements 2.3. Review and validate risks against procedures 2.4. Coordinate, plan, implement and evaluate additional training in a timely manner to meet the needs of individuals and the work site 2.5. Ensure practices are consistent with current standards and policies 2.6. Coordinate planning for response to major incidents and make known to the work group in readiness for implementation.
3. Maintain up-to-date professional development of knowledge and skills.	3.1. Undertake self education process in accordance with workplace principles and opportunities 3.2. Access links with various professional First Aid bodies and organisations to maintain currency in the field

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ELEMENT	PERFORMANCE CRITERIA
	3.3. Access and communicate promptly relevant information to work group, and maintain certification in accordance with workplace procedures and legislation.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
• oral and written communication skills.
Required knowledge
Knowledge and understanding of policy development and systems for human and physical resources sufficient to ensure that First Aid can be effectively and efficiently provided in the workplace. These include: • national training agenda • use of referral network • legal requirements • duty of care • State and Territory regulations relating to currency of skills and knowledge. Knowledge of training and assessment processes and methods. First Aid principles and practices.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a

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EVIDENCE GUIDE	
	manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations that will include disruptions to normal, smooth operation. Where applicable, assessment should replicate workplace conditions as far as possible. Where, for reasons of safety, access to equipment and resources and space, assessment takes place away from the workplace, simulations should be used to represent workplace conditions as closely as possible.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence may be demonstrated working individually, under supervision or as part of a First Aid team.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	Competence may be assessed in conjunction with other industry units of competency dealing with things such as: • workplace safety • workplace training • manufacturing practice/competitive manufacturing
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may

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RANGE STATEMENT	
be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Systems	Systems may include: • ordering, eg magazines, books • skills updating, eg attending conferences/workshops, reading publications • networking • communication • technological • training and assessment.
Accessing relevant information	Access relevant information may include: • meetings • seminars • log books (personal development) • conferences • alignment with professional First Aid bodies.
First Aid Bodies and Clinical Organisations	First Aid bodies and professional and clinical organisations/bodies could include: • Australian Resuscitation Council (ARC) • International Liaison Committee on Resuscitation (ILCOR) • support groups • registered providers/authorities.
Procedures	Procedures may be from organisations such as: • Australian Resuscitation Council (ARC) • National Health and Medical Research Council • Australian standards • company Standard Operating Procedures (SOPs) • risk management standards • legislation and regulation.
Education	Self education processes may include: • attendance at relevant seminars and conferences • maintenance of professional library • membership of other First Aid bodies • formal training • supervised or unsupervised practice to maintain currency of

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RANGE STATEMENT	
	competence.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	HSE

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMAOMIR407B Audit incident preparedness and established response systems

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the competency to assess the extent to which a facility is prepared to respond to an incident. This could apply to all of the realistically potential incidents which might occur to an organization, including those under its safety case. The person undertaking the audit would typically respond to the incident manager.

Application of the Unit

Application of the unit	In a typical scenario the person would undertake an analysis of existing incident preparedness and response systems as part of a continuous improvement process or spot check. Part of the audit may involve the conducting of an unscheduled incident response drill, analysing the results and providing a thorough debrief of the persons involved. The person then may make recommendations for changes to the system Key aspects of the competency include: • thorough examination of each of the various systems in place • identifying key areas where systems overlap or system breakdowns occur • ensuring that the established systems are working in accordance to the incident response plan and legislative requirements The person may: • communicate extensively within and outside the organisation • review and audit practices and processes relevant to incident response • identify and as necessary reinforce system benchmarks • provide input towards system continuous enhancement. • conduct and assess incident exercises as required. Generally the person would be an incident coordinator, manager or technical specialist and be part of an incident response team during the incident. They may have an ongoing role for managing incident information and/or the

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	incident information system.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Benchmarks for audit are clearly identified	1.1. Access, interpret and clarify the legislative, statutory and site requirements relating incident preparedness and response systems 1.2. Access and review relevant documentations of the plan and established management systems 1.3. Conduct consultations with stakeholders and specialist as necessary
2. Plan, organise and undertake audit of the established incident	2.1. Identify or develop methods to audit the established management systems and processes as prescribed by the plan and/or legislation in consultation with relevant

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ELEMENT	PERFORMANCE CRITERIA
response systems	personnel 2.2. Identify and secure the resources required to conduct the audit 2.3. Gather and sight relevant documents and all other evidence required in accordance with procedures 2.4. Conduct the audit according to prescribed/pre-agreed methodology and in a manner that enhances the organisation's confidence and commitment to the incident response system
3. Evaluate and report the results of the audit	3.1. Evaluate evidence gathered for reliability, validity, authenticity, sufficiency, currency and consistency 3.2. Promptly bring to the attention of relevant personnel any findings which have serious or immediate risks 3.3. Disseminate records of the process and outcomes of the audit, including justifiable recommendations complying with procedures, to appropriate personnel in a timely manner
4. Follow up results of the audit	4.1. Discuss and confirm results with relevant personnel and provide feedback including advice on corrective actions 4.2. Follow up corrective actions relating to deficiencies until resolution has been achieved

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
Competence includes the ability to isolate the causes of problems within the incident response system and to be able to distinguish between causes of problems indicated by: • audit methods fail to provide sufficient qualitative and quantitative data • audits fail to identify key system failures • actions arising from audits do not translate into improvements in the system • relationships between incident response partner organisations do not function as intended.
Required knowledge
The knowledge referred to in the Evidence Guide for this unit includes:

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REQUIRED SKILLS AND KNOWLEDGE
• relevant legislation • relevant company policy management systems/procedures relating to incident preparedness and response • company requirements in relation to audit and review procedures • hazard identification and control • OHS requirements • risk management principles and techniques • incident containment tactics.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment for this unit of competency will be by way of simulation or observation under incident conditions. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which can include a variety of incident circumstances. Simulations must, as closely as possible, approximate actual incident conditions and should be based on the actual facility. Assessments should include walk-throughs of the relevant competency components and may include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of 'what-if' scenarios both in the facility (during demonstration of normal operations and walk-throughs of abnormal operations) and off the site.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Consistent performance should be demonstrated. In particular look to see that competence in this unit reflects successful assessment in the critical aspects of:

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	• safe conduct of audit and review • identification of benchmarks for audit and review • development of methodologies for effective audit and review • compliance with prescribed methodologies for audit and review • evaluation of documents and evidence • demonstrated understanding of the value of accuracy, attention to detail and impartiality • information gathering, analysis and communication These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.
Context of and specific resources for assessment	Assessment will require (1) access to an accurately simulated environment or (2) a suitable method of gathering evidence of responding ability over a range of situations. A bank of scenarios/case studies/what-ifs and a bank of questions to probe the reasoning behind the observable actions will likewise be required.
Method of assessment	It may be appropriate to assess this unit concurrently with other relevant units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT
The Range Statement relates to the unit of competency as a whole. It allows for different work

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RANGE STATEMENT	
environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	Management systems include (but are not limited to): • evacuation • emergency operations structure • communications • information management • documentation and reporting requirements • resource management • training • audit and review system • financial management Documents and evidence may include: • electronic databases • videos • photographs • written information/records • training and learning programs
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.
Relationship to Major Hazard Facility Legislation	Organisations within the Chemical, Hydrocarbons and Oil Refining industries may find themselves falling under the provisions of various Major Hazard Facilities legislation. In developing this unit consideration has been given to the requirements of Sections 8 and 9 of the National Standard for the Control of Major Hazard Facilities [NOHSC:1014(2002)] and the National Code of Practice for the Control of Major Hazard Facilities [NOHSC:2016(1996)]. This unit will assist individuals to meet some of their obligations under the relevant State or Territory legislation. Responsibility for appropriate contextualisation and application of the unit to ensure compliance however, remains with the individual organisation.

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Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMAOMIR418B Coordinate incident response

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the coordination of the response to off-shore or on-shore incidents. The person may be the incident coordinator, or could be a member of the incident control centre team. The incident coordinator typically responds to the incident manager, who may be stationed away from the facility or plant.

Application of the Unit

Application of the unit	In a typical scenario, the person is in charge of an incident control centre on or near the facility. The incident coordinator is responsible for interactions between corporate headquarters, the on site incident response teams and the person in charge of the facility. There may be more than one incident response team involved depending on the size and complexity of the incident. Key aspects of the competence include: • minimising the escalation of the incident • allocation of resources and assets • tactical response planning, consistent with the philosophies and strategies of the organisation • close communication with the incident response team(s) • interactions with external agencies required to assist with the emergency • gathering information concerning the incident The individual may: • effectively communicate and consult with a range of individuals and organisations • develop incident response and/or incident search and rescue tactics based on information available • negotiate and communicate with internal support structures set up to assist with logistics planning, operations and external affairs Generally the individual would assume command of the incident response team(s) during an incident response though may be required to take advice from the incident support management group. At all times they would be

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	liaising and cooperating with members of the incident support management group.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Assess the situation and determine priorities	1.1. Seek incident information from appropriate on-site personnel 1.2. Monitor changes in the nature, extent and potential implications of the incident 1.3. Develop an incident response tactics based on analysis of the situation and consistent with the philosophies and strategies of the organisation 1.4. Identify required resources in accordance with the tactics developed

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ELEMENT	PERFORMANCE CRITERIA
	1.5. Continually review objectives in light of information updates, reports and feedback
2. Manage incident control centre	2.1. Brief incident control centre personnel on the scenario and tactics, their roles and responsibilities and of the way the centre will operate 2.2. Allocate tasks to incident control centre personnel commensurate with their roles and level of competence 2.3. Monitor performance of incident control centre personnel and review as the incident unfolds to determine ongoing requirements
3. Liaise with internal management and support structures	3.1. Regularly brief and provide communications to appropriate personnel in accordance with procedures 3.2. Monitor and review resources to determine changing requirements in accordance with changing circumstances 3.3. Ensure resources are available as required 3.4. Provide or obtain guidance and support to/from management and support structures.
4. Ensure communications systems are effective	4.1. Establish communications with personnel at the incident scene 4.2. Establish communications with other personnel on or off-site as required 4.3. Ensure communications systems are managed to provide optimum capability.
5. Conclude and review incident activities	5.1. Account for all personnel and other resources 5.2. Conduct a debrief and complete company incident reports 5.3. Evaluate and review tactics and procedures 5.4. Evaluate and document effectiveness of the control function and its interaction with command organisations 5.5. Communicate reports in accordance with company procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE
Required skills
Competence includes the ability to isolate the causes of issues within the incident response system and to be able to distinguish between causes of issues indicated by: • incorrectly determining the range and performance of resources required to address the incident • inappropriate resources being assigned to the incident response operation • failure of communications systems within the command post • overestimating the capabilities and competence levels of personnel.
Required knowledge
The knowledge referred to in the Evidence Guide for this unit includes: • incident management techniques • operational duration of essential equipment • legislative and regulatory requirements • coaching and team building concepts • the organisation's policies and procedures protocols • how to communicate effectively under stress.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment for this unit of competency will be by way of simulation or observation under incident conditions. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which can include a variety of incident circumstances. Simulations must, as closely as possible, approximate actual incident conditions and should be based on the actual facility. Assessments should include walk-throughs of the relevant competency

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	components and may include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of 'what-if' scenarios both in the facility (during demonstration of normal operations and walk-throughs of abnormal operations) and off the site.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate responsive action. The emphasis should be on the ability to deal effectively with the incident or to contribute effectively to the recovery from the incident. Consistent performance should be demonstrated. In particular look to see that: • incident responses are in accordance with company procedures • correct incident response equipment (where required) is used appropriately • the safety and/or successful recovery of personnel and others affected by the incident response is afforded priority in the actions taken • actions taken do not inhibit incident response effectiveness or further contribute to the incident • appropriate documentation including reports, journal entries, logs and/or clearances are completed in accordance with procedures These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from past workplace incident history, incidents in similar workplaces around the world, hazard analysis activities and/or similar sources.
Context of and specific resources for assessment	Assessment will require (1) access to an accurately simulated environment in the absence of an on-site incident environment, or (2) a suitable method of gathering evidence of responding ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning

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EVIDENCE GUIDE	
	behind the observable actions.
Method of assessment	In all workplace environments it may be appropriate to assess this unit concurrently with relevant PMAOMIR units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This unit of competency covers incidents that may include: • fire, explosion • loss of containment, eg gas leaks, spills • damage to facilities, eg accidents, crashes, aircraft • natural disasters, eg cyclones, wind, rain, earthquake, flood • other, eg riot, civil unrest, terrorism It includes all such items of equipment and unit operations that form part of the incident response system, and may include: • schematics, designs, detail drawings, maps/charts • data systems, computers systems, electronic aids • manuals, designs, operation procedures and instructions • emergency vehicles or equipment • vessels and aircraft Incident response may include: • search and rescue operations • engagement of emergency services (fire, ambulance, rescue,

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RANGE STATEMENT	
	military) • liaison with other agencies (environmental, clean-up, specialised troubleshooters) Typical problems for your facility may include: • communications problems • inappropriate information • confusion over roles and responsibilities • lack of cooperation • inappropriate location of command post in relation to incident
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.
Relationship to Major Hazard Facility Legislation	Organisations within the Chemical, Hydrocarbons and Oil Refining industries may find themselves falling under the provisions of various Major Hazard Facilities legislation. In developing this unit consideration has been given to the requirements of Sections 8 and 9 of the National Standard for the Control of Major Hazard Facilities [NOHSC:1014(2002)] and the National Code of Practice for the Control of Major Hazard Facilities [NOHSC:2016(1996)]. This unit will assist individuals to meet some of their obligations under the relevant State or Territory legislation. Responsibility for appropriate contextualisation and application of the unit to ensure compliance however, remains with the individual organisation.

Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

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Co-requisite units

Co-requisite units	

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PMAOMIR424B Develop and maintain community relationships

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the establishment of workable arrangements which engage and inform the community about aspects of the plant's operations and incident response systems. This could apply to information about the products the operation produces, critical events on the organisation's calendar such as incident response practices and means by which the community would be kept informed during an incident.

Application of the Unit

Application of the unit	In a typical scenario the person is a member of the incident room team and is designated with the task of ensuring the preparedness of the communities surrounding and/or affected by the facility to respond to an incident. For example the organisation is preparing to shut down part of the plant for routine maintenance and as part of that process some of the gas will be flared off. This will create a spectacular plume over the plant but because the community is alerted to both timing and what to expect, community panic and concern is limited. Key aspects of the competency include: • gathering and disseminating key information to the community • identifying key organisations in the community with which communication links need to be established • establishing inclusive strategies concerning both routine and non-routine events. This person would: • establish networks within the community • design and conduct public safety awareness activities that will establish community preparedness by enhancing awareness. While independent action may sometimes be required, the person is expected to liaise, cooperate and consult with other members of the incident management team as necessary.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify information that needs to be disseminated to the community	1.1. Access and examine incident response plans 1.2. Conduct consultations with appropriate personnel as necessary
2. Establish networks within the community	2.1. Identify stakeholders within the community 2.2. Initiate contact with key community stakeholders 2.3. Establish and maintain rapport 2.4. Enlist cooperation and support in organising and conducting public safety awareness activities
3. Design and conduct public safety awareness activities	3.1. Develop a plan in consultation with stakeholders and appropriate personnel 3.2. Design activities to support the plan in consultation

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ELEMENT	PERFORMANCE CRITERIA
	with stakeholders and appropriate personnel 3.3. Clearly identify measures for assessing the outcome of activities 3.4. Develop and distribute marketing materials and educational materials/resources appropriate to the context, issue and audience 3.5. Identify and secure other resources required 3.6. Develop and implement strategies for delivery of the project to ensure maximum effectiveness 3.7. Make adjustments as required to meet the needs of specific groups
4. Evaluate activities	4.1. Assess activity outcome against the planned goals/objectives and measures 4.2. Complete reports detailing activities, results and recommendations according to procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
Competence includes the ability to isolate the causes of problems within the incident response system and to be able to distinguish between causes of problems indicated by: • expressions of community concern about a lack of communication with the organisation • an atmosphere of mistrust existing between the community and the organisation • constant referrals of organisational activities to local, State or Commonwealth authorities • the volume of requests for information received from community groups or individuals • protest meetings or rallies by concerned residents.
Required knowledge
The knowledge referred to in the Evidence Guide for this unit includes: • relevant legislation • incident response plans and management systems (particularly warning signals and evacuation procedures) • promotional techniques and methods • group dynamics

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REQUIRED SKILLS AND KNOWLEDGE
• a range of presentation strategies and techniques • protocols and procedures • relevant organisational policies.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment for this unit of competency will be by way of simulation or observation under incident conditions. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which can include a variety of incident circumstances. Simulations must, as closely as possible, approximate actual incident conditions and should be based on the actual facility. Assessments should include walk-throughs of the relevant competency components and may include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of 'what-if' scenarios both in the facility (during demonstration of normal operations and walk-throughs of abnormal operations) and off the site.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Consistent performance should be demonstrated. In particular look to see that competence in this unit reflects successful assessment in the critical aspects of: • identification of networks critical to the development and implementation of public safety awareness activities • design, conduct and evaluation of public safety

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EVIDENCE GUIDE	
	awareness activities • effective communication skills These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from past workplace incident history, incidents in similar workplaces around the world, hazard analysis activities and/or similar sources.
Context of and specific resources for assessment	Assessment will require (1) access to an accurately simulated environment or (2) a suitable method of gathering evidence of responding ability over a range of situations. A bank of scenarios/case studies/what-ifs and a bank of questions to probe the reasoning behind the observable actions will likewise be required.
Method of assessment	It may be appropriate to assess this unit concurrently with other relevant units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	Public safety awareness activities may include: • distribution of educational materials/resources • use of media to disseminate information • public educational presentations

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RANGE STATEMENT	
	• conduct of or attendance in community meetings/forums • incident exercises Relevant information may include: • incident response plan and management systems in place to prevent an incident • warning signals in the event of an incident • procedures to be followed in the event of an incident relating to evacuation and welfare operations • appropriate people to contact and contact details • post-incident management systems
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.
Relationship to Major Hazard Facility Legislation	Organisations within the Chemical, Hydrocarbons and Oil Refining industries may find themselves falling under the provisions of various Major Hazard Facilities legislation. In developing this unit consideration has been given to the requirements of Sections 8 and 9 of the National Standard for the Control of Major Hazard Facilities [NOHSC:1014(2002)] and the National Code of Practice for the Control of Major Hazard Facilities [NOHSC:2016(1996)]. This unit will assist individuals to meet some of their obligations under the relevant State or Territory legislation. Responsibility for appropriate contextualisation and application of the unit to ensure compliance however, remains with the individual organisation.

Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

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Co-requisite units

Co-requisite Units	

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PMAOMIR430B Conduct and assess incident exercises

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit addresses the competence required to conduct and assess incident exercises. The person would be engaged in the construction of scenarios that approximate incident situations and exercises in dealing with those incidents.

Application of the Unit

Application of the unit	In a typical scenario the person would be a member of the incident room team and would be responsible for ensuring that both scheduled and unscheduled incident exercises took place. Results of these exercises would provide essential input into the audit and evaluation of incident preparedness of the facility. However, a proper post-exercise debrief is critical, as the exercise likewise has a strong educative value that promotes awareness and understanding among participants. Key aspects of the competence include: • establishing key objectives and strategic outcomes from incident exercises • improving the organisation's level of preparedness should an incident occur • improving the ability of personnel to respond appropriately and safely during an incident The person may: • communicate extensively both inside and outside the organisation • establish and support mechanisms for the design and conducting of incident exercises • review and evaluate the soundness of incident response plans and management systems. Generally the person would be an incident coordinator, manager or technical specialist and be part of an incident response team during the incident. They may have an ongoing role for managing the training and incident exercise system.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine objectives	1.1. Identify the need for the incident exercise in consultation with stakeholders 1.2. Determine the objectives of the exercise which meet the identified need
2. Design exercise	2.1. Select the exercise style, consistent with the objectives, in consultation with stakeholders 2.2. Design the exercise to ensure that objectives are met and address health, safety and environment issues 2.3. Identify and secure the resources to support the exercise 2.4. Distribute the exercise plan stating the objectives to appropriate personnel

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ELEMENT	PERFORMANCE CRITERIA
3. Manage exercise	3.1. Brief personnel involved in the exercise in respect of aims, objectives, expectations and activity outcomes 3.2. Use the exercise plan to initiate and facilitate the conduct and direction of the exercise 3.3. Conduct the exercise in a manner that addresses health, safety and environment issues 3.4. Monitor the progress of the exercise and provide feedback to personnel
4. Evaluate outcomes	4.1. Plan a post exercise debrief based on the conduct and outcomes of the exercise 4.2. Conduct a debrief with activity personnel 4.3. Review outcomes of the activities against objectives 4.4. Prepare and distribute a report of the activity to stakeholders

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
Competence includes the ability to isolate the causes of problems within the incident response system and to be able to distinguish between causes of problems indicated by: • exercises are not conducted according to expectations • unintended or inappropriate exercise outcomes • mismatches between equipment and incident requirements • lack of appropriate feedback at the conclusion of training exercises • an injury occurs during the conducting of the training exercise.
Required knowledge
The knowledge referred to in the Evidence Guide for this unit includes: • legislative and regulatory arrangements relating to incident management • incident response plan and management systems • incident management concepts and principles • adult learning principles • relevant networks • problem solving and decision making techniques • assessment and review techniques

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REQUIRED SKILLS AND KNOWLEDGE
• project management principles.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment for this unit of competency will be by way of simulation or observation under incident conditions. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which can include a variety of incident circumstances. Simulations must, as closely as possible, approximate actual incident conditions and should be based on the actual facility. Assessments should include walk-throughs of the relevant competency components and may include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of 'what-if' scenarios both in the facility (during demonstration of normal operations and walk-throughs of abnormal operations) and off the site.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Consistent performance should be demonstrated. In particular look to see that competence in this unit reflects successful assessment in the critical aspects of: • clearly identifying the need for the exercise • planning, conduct and evaluation of exercise • hazard identification and control • demonstrated understanding and ability to address health, safety and environment issues • briefing and debriefing These assessment activities should include a range of

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EVIDENCE GUIDE	
	problems, including new, unusual and improbable situations which may have been generated from past workplace incident history, incidents in similar workplaces around the world, hazard analysis activities and/or similar sources.
Context of and specific resources for assessment	Assessment will require (1) access to an accurately simulated environment or (2) a suitable method of gathering evidence of responding ability over a range of situations. A bank of scenarios/case studies/what-ifs and a bank of questions to probe the reasoning behind the observable actions will likewise be required.
Method of assessment	It may be appropriate to assess this unit concurrently with other relevant units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	Types of exercise may include: • scenario analyses • case studies • role plays • discussion exercises / desktop exercises • functional centre exercises (specific task environments within the workplace)

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RANGE STATEMENT	
	• field exercises • synthetic training • high level architecture • multimedia • virtual reality • distributed interactive software The design process may include: • determination of activity management structure • development of documentation • design of activity • issuing notifications • briefings and debriefings Activity personnel refers to people who assist in the conduct of the incident exercise and may include: • activity director • directing staff/coordinators/facilitators • safety officers • assessors/umpires • public relations staff • casualty simulators • role player liaison officers • administrative/welfare personnel to support learning and assessment tools Activity documentation may include: • activity notification • activity management checklists • general instructions • safety instructions • timetable/schedule of events, exercise plan • activity inputs
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.
Relationship to Major Hazard Facility	Organisations within the Chemical, Hydrocarbons and Oil Refining industries may find themselves falling under the provisions of various Major Hazard Facilities legislation. In developing this unit consideration has been given to the requirements of Sections 8 and 9 of

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RANGE STATEMENT	
Legislation	the National Standard for the Control of Major Hazard Facilities [NOHSC:1014(2002)] and the National Code of Practice for the Control of Major Hazard Facilities [NOHSC:2016(1996)]. This unit will assist individuals to meet some of their obligations under the relevant State or Territory legislation. Responsibility for appropriate contextualisation and application of the unit to ensure compliance however, remains with the individual organisation.

Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMAOMIR444B Develop incident containment tactics

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the competency required in the development of tactics that are to be used in the containment of incidents in on-shore and off-shore facilities. The person would typically be an incident coordinator who would respond to the incident manager.

Application of the Unit

Application of the unit	In a typical scenario the person must ensure that the tactics proposed to be employed in response to an incident are appropriate to the circumstances and that actions taken in changing circumstances are effective in dealing with the incident. For instance the options available to incident response teams may be limited and include the need to follow specific procedures or sequences of events. In such a situation the organisation may need clearly defined procedures to ensure that all levels of incident response are aware of how the incident is to be confronted. Key aspects of this competency include: • forming clear and unambiguous views about the nature of the potential incident • evaluating and prioritising alternative tactics • analysing and interpreting information for trends and impacts • forwarding key information to those who require it The person may: • undertake critical analysis and problem solving • examine specific scenarios and develop tactics to physically contain those events • evaluate alternative tactics • recommend the most appropriate strategy • document strategies Generally the person would be an incident coordinator, manager or technical specialist and be part of an incident response team during the incident. They may have an ongoing role for managing incident information and/or the incident information system.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify incident containment tactics	1.1. Identify risk characteristics of the possible incident scenarios 1.2. Identify specific objectives of incident containment 1.3. Identify existing tactics 1.4. Develop a range of alternative tactics
2. Evaluate tactics	2.1. Predict incident behaviour and growth under alternative strategy scenarios 2.2. Consider issues relating to health, safety and environment 2.3. Identify and secure resource requirements for alternative tactics 2.4. Identify the impact of tactics on a range of factors 2.5. Identify and clearly document tactics

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ELEMENT	PERFORMANCE CRITERIA
	2.6. Obtain, collate and record feedback on tactics from stakeholders and incident managers and ensure this is reflected into the documentation according to procedures 2.7. Negotiate stakeholder needs and address
3. Select tactics	3.1. Document findings and feedback on the suitability of different tactics 3.2. Recommend preferred tactics according to procedures 3.3. Document tactics and build into strategies and training doctrines
4. Adopt strategies	4.1. Incorporate documentation on selected tactics into the appropriate incident management manuals 4.2. Notify stakeholders of new tactics 4.3. Incorporate selected tactics into incident training exercises

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
Competence includes the ability to isolate the causes of problems within the incident response system and to be able to distinguish between causes of problems indicated by: • tactics fail to achieve the desired outcomes • input to tactic development is limited or of less value than expected • tactics when exercised show gaps or limitations in effectiveness • adoption of tactics proves problematic or resistance is encountered • incident containment proves to be of limited success.
Required knowledge
The knowledge referred to in the Evidence Guide for this unit includes: • different types of incidents and risks • incident prediction • equipment required • rescue techniques • intervention and control techniques for heating, fires and explosions • incident resources and how to access them • incident response and disaster planning processes and techniques

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REQUIRED SKILLS AND KNOWLEDGE
• relevant legislation • hazard identification and control • risk management principles and techniques • structure, roles, capabilities and operational limitations of external resources and agencies • insurance policies and considerations • economic impact and considerations.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment for this unit of competency will be by way of simulation or observation under incident conditions. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which can include a variety of incident circumstances. Simulations must, as closely as possible, approximate actual incident conditions and should be based on the actual facility. Assessments should include walk-throughs of the relevant competency components and may include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of 'what-if' scenarios both in the facility (during demonstration of normal operations and walk-throughs of abnormal operations) and off the site.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate responsive action. The emphasis should be on the ability to deal effectively with the incident or to contribute effectively to the recovery from the incident. Consistent performance should be demonstrated. In particular look to see that: • understanding of incident containment tactics is demonstrated • understanding of the regulatory environment in which actions

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EVIDENCE GUIDE	
	need to take place is explained • the impact of the incident on environment, local community and economy of the organisation is understood • tactics are evaluated with consideration given to advantages and disadvantages • hazard risk identification and control is demonstrated • information gathering, analysis and communication are demonstrated to the required level • relevant personnel and experts/specialists with whom consultation must take place are identified These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from past workplace incident history, incidents in similar workplaces around the world, hazard analysis activities and/or similar sources.
Context of and specific resources for assessment	Assessment will require (1) access to an accurately simulated environment or (2) a suitable method of gathering evidence of responding ability over a range of situations. A bank of scenarios/case studies/what-ifs and a bank of questions to probe the reasoning behind the observable actions will likewise be required.
Method of assessment	It may be appropriate to assess this unit concurrently with other relevant units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

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RANGE STATEMENT	
Context	Incidents may include: • fire • explosion • gas or oil leak • accident • bomb threat • missing personnel • combination of the above Tactics are identified through: • consultation with experts • literature review Stakeholders may include: • shareholders • board of directors • employees • unions • contractors • suppliers • insurance companies • local community • fire brigade • police • local emergency management organisations • medical services • relevant public authority
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.
Relationship to Major Hazard Facility Legislation	Organisations within the Chemical, Hydrocarbons and Oil Refining industries may find themselves falling under the provisions of various Major Hazard Facilities legislation. In developing this unit consideration has been given to the requirements of Sections 8 and 9 of the National Standard for the Control of Major Hazard Facilities [NOHSC:1014(2002)] and the National Code of Practice for the Control of Major Hazard Facilities [NOHSC:2016(1996)]. This unit will assist individuals to meet some of their obligations under the relevant State or Territory legislation. Responsibility for

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RANGE STATEMENT	
	appropriate contextualisation and application of the unit to ensure compliance, however, remains with the individual organisation.

Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMAOMIR449B Monitor legal compliance obligations during incidents

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	In a typical scenario, a person oversights the operations of an incident or a crisis management team to preclude possible breaches of legislation and regulations during incidents on sites administered by the organisation and advises on compliance issues.

Application of the Unit

Application of the unit	Typically this person may be a company legal officer, environmental officer or a site/facility safety officer. Such incidents might include: • loss of containment such as spills or gas/vapour release • fire • environmental incident or damage occurring through actions taken to resolve an incident • catastrophic failure of plant, assets or equipment • loss of life or occurrence of serious injury The individual would: • advise the management team concerning potential breaches of legislation • monitor the organisations efforts during recovery to maintain compliance • negotiate controls for restoration and clean up activities or other actions • submit organisational reports and prepare for legal proceedings Generally the individual would be part of a crisis management team during any incident however may work independently in some circumstances. At all times they would be liaising and cooperating with other members of the crisis management team.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Review incident response plans	1.1. Identify legislation and regulations relevant to possible incident scenarios 1.2. Determine possible compliance issues with planned responses 1.3. Negotiate alternative response plans which do not raise compliance issues 1.4. Ensure plans, equipment and training are modified to reflect changed response plans.
2. Oversee the operations of the incident management team	2.1. Ensure that the incident team is aware of legislation that needs to be complied with during the incident 2.2. Obtain information concerning legal ramifications as required in accordance with organisation's policies 2.3. Ensure accurate recording of all relevant details of all agreed actions

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ELEMENT	PERFORMANCE CRITERIA
	2.4. Assess actions taken and proposed against relevant legislation to determine compliance and possible impacts on the company
3. Advise appropriate action to facilitate compliance	3.1. Undertake consultations with regulatory authorities to facilitate minimal impact resolutions 3.2. Advise management of options that are available to remain compliant 3.3. Provide advice on actions to achieve compliance
4. Monitor actions taken to achieve compliance	4.1. Monitor company actions to resolve incidents and achieve compliance or remain compliant 4.2. Document actions taken by the organisation to remain compliant 4.3. Prepare reports for management regarding outcomes from the incident and any material breaches of legislation that have occurred 4.4. Prepare for possible legal proceedings within required timeframe
5. Seek improvements to incident responses	5.1. Identify possible areas for improvement 5.2. Develop improved responses in liaison with relevant people 5.3. Ensure plans, equipment and training are modified to reflect improved response plans.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
Competence includes the ability to isolate the causes of issues within the incident response system and to be able to distinguish between causes of issues indicated by: • failed compliance measures • inability to locate relevant legislation • failure to comply with timeframes dictated by legislation or regulation.
Required knowledge
The knowledge referred to in the Evidence Guide for this unit includes:

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REQUIRED SKILLS AND KNOWLEDGE
• relevant legislation and regulations • allowable defences for apparent compliance breaches • organisational policies and procedures • organisational policy and procedures concerning release of information to external bodies • the limits imposed by the organisation's negotiating parameters.

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Assessment for this unit of competency will be by way of simulation or under incident conditions. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which can include a variety of incident circumstances. Simulations must, as closely as possible, approximate actual incident conditions and should be based on the actual facility. Assessments should include walk-throughs of the relevant competency components and may include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of 'what-if' scenarios both in the facility (during demonstration of normal operations and walk-throughs of abnormal operations) and off the site.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to correctly respond to incident situations and in implementing appropriate action. The emphasis should be on the ability to stay ahead of the problem rather than to have to take drastic action in order to recover the situation. In particular look to see that:

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EVIDENCE GUIDE	
	• incident response plans are compliant and training and procedures reflect those plans • incidents are monitored and advise obtained where required and given to minimise/ prevent non-compliance • the safety and/or successful recovery of the individual and others affected by the incident response is afforded priority in the actions taken • actions taken do not inhibit incident response effectiveness or further contribute to the incident • appropriate documentation including reports, journal entries, logs and/or clearances are completed in accordance with procedures These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.
Context of and specific resources for assessment	Assessment will require (1) access to an accurately simulated environment in the absence of an on-site incident environment, or (2) a suitable method of gathering evidence of responding ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all workplace environments it may be appropriate to assess this unit concurrently with other relevant units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

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Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This unit of competency includes all such items of equipment and unit operations which form part of the incident response system. In your facility this may include (select relevant items): • computers • recording equipment • legislation and regulations Typical problems for your facility may include: • difficulties tracking and identifying relevant legislation or amendments • managing evidence for later investigations or enquiries • interpersonal conflicts • conflicts of interest
Health, safety and environment (HSE)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.
Relationship to Major Hazard Facility Legislation	Organisations within the Chemical, Hydrocarbons and Oil Refining industries may find themselves falling under the provisions of various Major Hazard Facilities legislation. In developing this unit consideration has been given to the requirements of Sections 8 and 9 of the National Standard for the Control of Major Hazard Facilities [NOHSC:1014(2002)] and the National Code of Practice for the Control of Major Hazard Facilities [NOHSC:2016(1996)]. This unit will assist individuals to meet some of their obligations under the relevant State or Territory legislation. Responsibility for appropriate contextualisation and application of the unit to ensure compliance however, remains with the individual organisation.

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Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMAOPS101C Read dials and indicators

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers making (or taking) readings/measurements in a variety of sites and locations, using common types of plant instrumentation. It also covers recording measurement results in a prescribed format, according to procedures and with the appropriate level of detail included in all reports.

Application of the Unit

Application of the unit	In a typical scenario an operator patrols the plant taking a range of readings to complete logs and check on the operation of the plant. The operator needs to interpret the display on the instrument and record the appropriate reading. As part of this process, they check that the instrument is within calibration (where appropriate) and make a judgement as to whether the reading is 'reasonable' or whether some action needs to be taken.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Contribute to controlling hazards in work area.	1.1. Identify hazards in work area 1.2. Take appropriate action to control risks according to procedures.
2. Identify appropriate measuring device readings.	2.1. Explain the need for calibration and where appropriate, confirm the calibration of the measuring device 2.2. Select appropriate units on the measuring device 2.3. Select appropriate scale(s) on the measuring device.
3. Perform measurements.	3.1. Identify the range of results that could be obtained 3.2. Identify and take account of relevant external factors 3.3. Perform measurements using appropriate techniques 3.4. Identify measurements outside the range of expected results 3.5. Take action on measurements outside expected range according to procedures.
4. Record results	4.1. Record readings accurately in the appropriate format 4.2. Record the results to the appropriate level of detail.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
• efficient and effective operation of plant/equipment

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REQUIRED SKILLS AND KNOWLEDGE
• hazard analysis • completing plant records • communication • problem solving.
Required knowledge
• basic units of measurement • measuring devices, including gauges, dip-sticks, thermometers and the like • graphs and scales • workplace Standard Operating Procedures (SOPs) related to this competency • typical problems with measuring equipment applicable to this competency • procedures for reporting or dealing with typical equipment problems and threats to safety.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise situations requiring action and then in implementing appropriate corrective action. While it is not expected that the operator will understand the full implications of readings outside the normal range, there should be awareness of the safety implications

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EVIDENCE GUIDE	
	and the appropriate priority for response for such readings. Consistent performance should be demonstrated. In particular look to see that: • readings which are out of range or unusual/unexpected signs of problems or potential problems with the equipment/processes are recognised • appropriate action is taken in a timely manner • hazards are recognised and appropriate action is taken to control risks arising from such hazards. These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus, with a walk-through forming part of the response. The assessment activities should include responding to a range of problems.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units. It may be appropriate to assess this unit concurrently with units related to HSE.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in

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RANGE STATEMENT	
the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This unit applies to reading process instrumentation in any plant or related situation. Readings may need to be made at heights, in wet or restricted conditions, or close to hot or moving equipment.

Dials and indicators	Typical dials and indicators include (select relevant items):
	• analogue dials, such as:
	  • pressure gauge
	  • rev counter
	  • temperature dial
	• digital readouts, such as:
	  • pH meter
	  • temperature probe
	  • ammeter
	  • flow meter
	  • weigh scales.

Calibration checks	Calibration checks could include: • checking the date that the next calibration is required, eg weigh scale, pressure gauge • using a calibration button on the instrument, eg zero button on an ammeter, calibration button on an electronic meter.
Appropriate action	Appropriate action includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria

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	and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Operational/technical

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMAOPS280B Interpret process plant schematics

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the interpretation of process plant schematics for a range of operations uses. It includes a wide range of schematics.

Application of the Unit

Application of the unit	In a typical scenario, an operator needs to undertake an activity on the plant, or related to the plant and uses a schematic as an aid in interpreting the plant and/or the plant systems or as an aid to explaining the plant/plant systems to another person (who may be another operator, technical specialist, member of management, maintenance worker or contractor). The operator would: • find relevant information from the schematic • mark up a schematic for their own use or the use of another person • sketch a schematic, using relevant symbols, as part of an explanation to another person or as an *aide memoir* for themselves This competency covers all general and common symbols and also includes those specific to the relevant plant which is the operator's area of responsibility. It includes those conventions which are applied by their place of work.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Relate schematic to plant.	1.1. Match items on schematic with items in plant 1.2. Determine relevant pipe and flange schedules 1.3. Identify sizes and types of minor equipment 1.4. Locate relevant instrument tapping points and control points 1.5. Identify direction of flow on schematic and in plant.
2. Identify points required to prepare plant.	2.1. Locate isolation and blanking points for any item of the relevant schematic 2.2. Identify drain/vent/purge points for any item on the

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ELEMENT	PERFORMANCE CRITERIA
	relevant schematic 2.3. Identify trip system elements 2.4. Use schematic to check/develop work lists.
3. Describe the process with a schematic.	3.1. Use a schematic as the basis of a description of the process 3.2. Describe the process using a manual schematic 3.3. Walk through process identifying all plant items in process order 3.4. Identify key conditions/variables from a relevant schematic.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • interpretation of symbols and other drawing elements • communication • problem solving
Required knowledge
Competence includes an understanding of process plant schematics and their application to the actual plant and process. In particular it includes a knowledge of: • symbols used on schematics by that organisation • schematic conventions, eg with particular reference to crossing and branching lines • indications of equipment/pipe specifications • indications of process conditions/limits • cause and effect interpretation as relevant

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the

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EVIDENCE GUIDE	
performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to apply schematics to plant/process based situations. Consistent performance should be demonstrated. In particular look to see that: • critical process/plant features can be identified from a schematic • main process features can be described using a schematic.
Context of and specific resources for assessment	Assessment will require access to a plant over an extended period of time, or a suitable method of gathering evidence of ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

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Items	Items on schematic/in plant includes:
	• all major plant items such as:
	  • vessels,
	  • columns,
	  • reactors
	  • heat exchangers
	• minor plant items

Context	Schematics have various names and includes: • P&IDs (piping and instrumentation diagrams) • PFDs (process flow diagrams) • PEFs (Process Engineering Flow) • cause and effect diagrams/matrix Unless qualified in the unit, 'schematic' means a formally drawn, authorized schematic and may be hard copy or electronic.
Symbols	Symbols and conventions used in the schematics for the relevant plant area should be used. They may be Australian Standards symbols, the organisation's standard symbols or some other standard system:
Minor equipment	Minor equipment includes that equipment commonly described by size and type and includes: • pumps • valves • strainers • filters • instrumentation (local and remote) It typically would not include items such as vessels, columns, reactors or heat exchangers which would be major plant items.
Plant preparation	Plant preparation entails all that activity which may be required to render the plant safe for non-operational work (which is typically maintenance but may be other work) and includes: • isolations

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RANGE STATEMENT	
	• blank/spade/spectacle blind, breakout spool locations • draining • purging • blanketing • venting • ventilating • locating plant, equipment and services - above ground • locating below ground (or otherwise obscured) pipeline and services.

Key conditions	Key conditions includes:
	• normal range of process conditions such as
	  • level
	  • pressure
	  • flow
	  • temperature
	• alarm conditions/values
	• trip, ESD values

Work lists	Work lists may include: • punch list • tag numbers • spade/blind lists • similar lists
Manual schematic	Manual schematic may include: • a hand drawn sketch of the part of the process of interest • a mark up of a formally drawn schematic Schematics may be hard copy or electronic.
Appropriate action	Appropriate action includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred

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RANGE STATEMENT	
	• reporting problems outside area of responsibility to designated person.
Procedures	Procedures may be written, verbal, computer-based or in some other form. They include: • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Responsible Care) and government regulations.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Operational/technical

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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PMAOPS350B Match and adjust colour

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the use of colour matching samples in comparing the colour of a product to the standard and then recommending adjustments to be made to bring the colour into the acceptable range.

Application of the Unit

Application of the unit	In a typical scenario, a technician prepares a colour sample, compares it to the standard and then recommends adjustments (if required) in order to bring the product's colour within the acceptable range. This may be done using a 'colour computer' or by eye. The adjustments would be by making additions to the batch to bring it into range without overshooting. The 'standard' might be for a product being manufactured or for a new product being developed. The ability to recommend adjustments is the critical element of this unit as this requires a significant understanding of colour. The technician would: • prepare a colour sample • analyse the colour sample and compare it to the standard • recommend adjustments to bring the batch into colour specification. Generally the technician would work alone while colour matching, but must be capable of communicating effectively with the relevant operating personnel.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare colour sample.	1.1. Identify required sample properties 1.2. Select appropriate sample preparation method 1.3. Identify required sample preparation conditions 1.4. Adjust and control sample preparation conditions 1.5. Prepare colour sample.
2. Compare colour sample to standard.	2.1. Identify light conditions for comparison 2.2. Compare colour sample to standard using 'colour computer' as required 2.3. Compare colour sample to standard by eye as required 2.4. Reconcile data from each comparison if appropriate.
3. Recommend adjustments to batch.	3.1. Estimate the colourant additions needed to bring batch to standard 3.2. Recommend additions to relevant personnel as appropriate 3.3. Recommend additional mixing/processing requirements to procedure 3.4. Repeat sample preparation, colour matching and

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ELEMENT	PERFORMANCE CRITERIA
	adjustment until correct colour is obtained.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
This competency requires the skills of: • discrimination • analysis • interpolation and extrapolation of data
Required knowledge

Competence includes an understanding of colour and how the pigments used interact with the process to develop the required colour in the final product. In particular it includes the ability to:
• recognise hue, value and chroma (or colour/tone, lightness/shade and saturation) differences
• describe the effect of a change of light conditions on the appearance of the colour for the pigment combination used as relevant to the product
• recognise colourant addition and colourant dispersion differences
• make judgements based on:
  • perceptibility
  • acceptability/tolerance
  • grade 1, 2 or 3 match as required by specification
• describe the impact of opacity on colour as relevant to the product

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

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EVIDENCE GUIDE	
Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster. Consistent performance should be demonstrated. In particular look to see that: • estimates of required adjustments are consistent with the colour match data • adjustments are made cautiously and without overshooting • adjustments are made efficiently with a minimum number of adjustments to bring the batch into specification. These aspects may be assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the

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EVIDENCE GUIDE	
	past incident history of the plant.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This unit of competency includes the use of items of equipment required for colour sample preparation and colour matching. Sample properties may include: • surface finish • gloss • thickness • opacity • substrate properties.

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RANGE STATEMENT	
	Sample preparation methods may include: • draw down • spraying • brushing. • moulding • casting • milling • pressing. Sample preparation conditions may include: • temperature • drying rate • time • pressure • volume. Colourants may include: • pigments • masterbatches • tinters.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Operational/technical

Competency field

Competency field	

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Co-requisite units

Co-requisite units	

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PMAOPS402A Respond to abnormal process situations

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit applies an in depth knowledge of process and plant to the recognition and solving of more complex/less obvious process/plant/ technical problems.

Application of the Unit

Application of the unit	In a typical scenario, a senior technician or para-professional investigates a plant unit/part of the process which is not performing as well as it has/as expected. They methodically investigate this technical problem, come to a conclusion as to the cause and then initiate appropriate corrective action. The corrective action may well be beyond the scope of competency and responsibility of the person to implement. This unit applies to problems which are not solvable by direct observation and require systematic investigation: • damage to/wear of tower trays • internal leaks of heat exchangers • collapse of/channelling in tower/column/vessel packing The technician would: • clarify the problem • analyse problem cause(s) • recommend a solution to the problem. Generally the technician would work alone for this unit, although the ability to communicate with all internal and external stakeholders is vital.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	*MSAPMSUP390A*	*Use structured problem solving tools*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Recognise there is a problem.	1.1. Compare current performance with expected/historic performance 1.2. Identify plant/process areas with poor performance 1.3. Check the impact of routine adjustments to improve performance 1.4. Identify problems not solved by the routine solutions.
2. Define the problem.	2.1. Apply problem isolation techniques to isolate problem to a small part of the plant/process 2.2. Quantify the effect of the problem in operational terms 2.3. Postulate possible causes of the problem 2.4. Identify types of evidence for each possible cause 2.5. Investigate problem to accumulate evidence of cause type 2.6. Analyse data to confirm cause of problem 2.7. Determine the level of severity of the problem, priority of any required action.
3. Develop solution.	3.1. Discuss possible solutions to cause with relevant people 3.2. Determine whether a quick fix is needed

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ELEMENT	PERFORMANCE CRITERIA
	3.3. Arrange for implementation of quick fix if required 3.4. Check effectiveness of quick fix and take appropriate action 3.5. Agree required solution with appropriate people 3.6. Arrange for required solution to be undertaken in appropriate time frame 3.7. Follow items initiated through until final resolution has occurred 3.8. Check effectiveness of solution and take appropriate action 3.9. Complete reports to procedure.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
This unit requires skills of: • analysis • problem solving • negotiation • communication • basic mathematics
Required knowledge
Competence includes a deep understanding of: • plant equipment, its characteristics and limitations • impact of variations in plant/process and the distinctive signs of each variation • process chemistry, physics and biochemistry as relevant, eg to the extent of writing chemical equations and identifying factors controlling reaction rate and yield or equivalent • problem isolation techniques • problem analysis techniques • organisation approval processes

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include a range of problems, problem causes and environments. Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual problems and should include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to define and analyse the problem as well as deal with the stakeholders. The stakeholders should be satisfied with the solution, as well as the solution being technically sound. Consistent performance should be demonstrated. In particular look to see that: • different types of problems can be analysed and resolved • different types of stakeholders can be satisfied • the range of possible causes can be identified and analysed and the most likely cause determined • appropriate action is taken. These aspects may be best assessed using a range of scenarios/case studies/what-ifs. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past history and similar sources.
Context of and specific resources for	Assessment will require a suitable method of

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EVIDENCE GUIDE	
assessment	gathering evidence of problem solving ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This unit of competency includes problems in the plant, plant equipment or process which may make itself evident through lower quality, lower rates, greater variability or greater difficulty in control.
Health, safety and environment (HSE)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

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Unit Sector(s)

Unit sector	Operational/technical

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMAOPS405B Operate complex control systems

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the operation of a complex control panel. These controllers use a large number of control loops and a broad range of control algorithms. The panel will control entire plant areas and multiple products/ process streams. It will typically be located off plant in a control room and will require managing multiple complex tasks.

Application of the Unit

Application of the unit	In a typical scenario an operations technician uses a complex process control system to operate and monitor an entire plant area consisting of several plant units/systems. This control system would typically be an advanced control system and may include operation of simpler control systems as part of its operation. This panel technician/central control room operator has an overall responsibility for the operation of all units of equipment within the entire plant area and may include optimization of the area using the control system. As such they often also take a lead role as part of the operating team. Competencies required by this role other than panel competencies as such are not covered by this unit. The operations technician would: • monitor and operate equipment in the entire plant area • solve process problems related to the plant area • liaise with other plant areas as necessary • use the advanced control features of the control system Generally the operations technician would be part of a team during start up, shut down and normal operating conditions and would be expected to be capable of demonstrating competence in all parts of this unit. He/she would be taking a leading role in liaising and cooperating with other members of the team. Typically the panel operator will liaise with other 'outside operators', however this unit does not preclude the situation where the panel operator may also undertake 'outside' functions.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Use operator interface.	1.1. Use keyboards, track ball and monitor and/or stand alone controllers to access control system/panel 1.2. Monitor the process using the operator interfaces 1.3. Select appropriate controller modes 1.4. Access historical data and information 1.5. Acknowledge messages and alarms 1.6. Access advanced control features as appropriate
2. Access control information.	2.1. Obtain relevant data and information from the control system by applying systems knowledge 2.2. Identify the status of individual pieces of equipment from the control panel and use information to identify

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ELEMENT	PERFORMANCE CRITERIA
	potential faults 2.3. Minimise fluctuations and variations in process through the interpretation of existing trends and control schematics 2.4. Determine the overall operating effectiveness of the plant area related to the required targets for the area 2.5. Record process variations/irregularities to procedures.
3. Control process variations and monitor operations.	3.1. Use historical data to assist the identification of problems 3.2. Process available information to identify potential faults 3.3. Undertake required set point/output changes to meet plant area and process requirements 3.4. Adjust production in response to test results and control panel information 3.5. Monitor key process and environmental variables and take appropriate action 3.6. Adjust controller settings in accordance with procedures 3.7. Use advanced control features as appropriate 3.8. Optimise entire plant area in accordance with guidelines 3.9. Undertake calibration operations as appropriate 3.10. Coordinate with stakeholders external to the plant area as appropriate 3.11. Record adjustments and variations to specifications/schedules 3.12. Communicate to appropriate personnel as required.
4. Facilitate planned and unplanned process start-ups and shut-downs.	4.1. Select and apply procedures to planned startup and shutdown processes 4.2. Select and apply procedures to unplanned shutdown processes 4.3. Implement all required emergency responses 4.4. Communicate necessary information to all personnel affected by events 4.5. Log all required information.
5. Respond to alarms or out of specification conditions.	5.1. Identify system(s) affected by the alarm or condition 5.2. Interpret alarms and prioritise actions to be taken

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ELEMENT	PERFORMANCE CRITERIA
	5.3. Respond to the alarm or incident by following procedures 5.4. Deal with any out of specification material in accordance with procedures 5.5. Communicate the problem/solution to appropriate personnel 5.6. Record the information as required 5.7. Provide details of the alarm and action taken to the next shift at change over 5.8. Follow the incident up see that appropriate action has been taken.
6. Control hazards.	6.1. Identify hazards in the production/processing work area 6.2. Assess the risks arising from those hazards 6.3. Implement measures to control risks in line with procedures and duty of care
7. Resolve other problems within scope of responsibility.	7.1. Identify possible problems in equipment, control systems or process 7.2. Determine problems needing action 7.3. Determine possible fault causes 7.4. Rectify problem using appropriate solution within area of responsibility 7.5. Follow initiated items through until final resolution has occurred 7.6. Report problems outside area of responsibility to designated person.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
Competence includes the ability to distinguish between causes of problems/alarms/fault indications such as: • instrument failure/malfunction • electrical failure/malfunction

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REQUIRED SKILLS AND KNOWLEDGE

- mechanical failure/malfunction
- equipment design deficiencies
- product parameters (temperature, flows, pressure and levels)
- process control system malfunction
- power/utility failures
- software problems
- multitasking.

An ability to communicate with other work groups and personnel during the operation and monitoring of this panel is considered to be an essential element of this unit of competency.

Required knowledge

The knowledge referred to in the Evidence Guide for this unit includes:

- advanced control features
- interactions between control loops
- interactions between plant units within the entire plant
- the architecture and location of the process/production equipment
- specific plant process operations
- interactions between plant items/processes
- product specifications and tolerances
- systems operating parameters
- system integrity limits
- process control philosophies and strategies
- emergency shutdown procedures
- process specific physics, chemistry and mathematics
- relevant chemistry of the process to the level of writing chemical equations and identifying and manipulating factors controlling rate of reaction and yield (or equivalent physics for a physical process/biochemistry for a biochemical process) - chemistry to include both intended products and interfering reactions (eg salts, hydrates)
- basic science of upstream and downstream processes
- interactions between plant area and other value stream members
- impact of external factors, eg variations in weather, feed etc
- complex process drawings, eg P&ID, PFD, cause and effect
- basis of control for the plant/s
- instrumentation and control systems including feed forward, feed back and open control
- instrumentation and control system components (eg relevant primary sensing devices, final control elements, transducers/transmitters)
- control loops (including PID control, set points, controlled variable, indicated variable)
- interaction between multiple control loops (including cascade control)
- impacts of changing controller settings and the limits within which changes can be made
- effective communication techniques

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REQUIRED SKILLS AND KNOWLEDGE
• organisation procedures • UPS and its applications and use.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios, role plays and 3D virtual reality interactive systems. In the case of evacuation training or of training for competencies practiced in life threatening situations, simulation may be used for the bulk of the training. This unit of competency requires an application of the knowledge contained in the use of the process control system and its integral equipment, to the level needed to maintain control and recognise and resolve problems. This can be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate responses. The emphasis should be on the ability to stay out of

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EVIDENCE GUIDE	
	trouble rather than on recovery from a disaster. Consistent performance should be demonstrated. In particular look to see that: • early warning signs of equipment/processes needing attention or with potential problems are recognised • the range of possible causes can be identified and analysed and the most likely cause determined • appropriate action is taken to ensure a timely return to full performance • obvious problems in related plant areas are recognised and an appropriate contribution made to their solution. These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations, which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.
Context of and specific resources for assessment	Assessment will require access to a process control system over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork, communication and leadership units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

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Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicized wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This unit of competency includes all such items of equipment and unit operations which form part of the control system. For your control room this may include (select relevant items): • process control systems (eg Distributed Control Systems) • use of multiple control systems • personal computers • printers • fire and gas detection/protection systems • emergency shutdown systems • communications systems. Typical problems for your plant may include: • operating without advanced control features • loss of power/utilities • analysing failure modes • variation/loss of feed • unstable control of pressure, temperature level and flows • control equipment failure • process plant trips • change in atmospheric conditions (rain, temperature, wind, lightning) • emergency situations.
Alarms or abnormal conditions	Alarms or other abnormal conditions includes: • emergency, including emergency shut down • partial or complete controller failure.
Other problems	Other problems includes: • problem solving control functions
Appropriate action	Appropriate action includes: • determining problems needing action

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RANGE STATEMENT	
	• determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person.
Procedures	Procedures may be written, verbal, computer-based or in some other form. They include: • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Responsible Care) and government regulations.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Operational/technical

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMAOPS410B Monitor remote production facilities

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	In a typical scenario, a technician in a central location looks after the operation of a remote production facility. This may be achieved by using ground based or satellite communications systems. The competency covers the operation and management of remote plants, treatment stations or satellite locations.

Application of the Unit

Application of the unit	Typically these stations may include: • wellheads • separation facilities • utility systems • remote pumping and compression stations • remote plants • fire and gas safety systems and associated piping and instrumentation. The operations technician would: • identify and rectify operational problems • conduct well testing • conduct critical function testing. Control of a remote production facility may require operation and process monitoring via a remote control system. Generally the operations technician would operate independently and be expected to be capable of performing all parts of this unit. However they may be part of a team during critical inspections or maintenance operations. At all times they would be liaising and cooperating with other members of the team.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work.	1.1. Identify work requirements 1.2. Identify and control hazards 1.3. Coordinate with appropriate personnel
2. Conduct product separation.	2.1. Centralise and prepare well products for initial multi-phase separation, storage and distribution as determined by the required production targets and objectives 2.2. Use multi-phase high and low pressure separation, utilising heat and chemical treatments, to effectively separate the product 2.3. Monitor the separation process via control room operation to ensure all product flows, pressures and temperatures are maintained within correct operating parameters 2.4. Operate and monitor all required utility services to assist in the separation process.
3. Recover and measure product.	3.1. Transfer treated waste water from the separation process for further treatment as required prior to re-injection or disposal 3.2. Ensure that all available product is recovered and all waste water

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ELEMENT	PERFORMANCE CRITERIA
	is made safe for further use or disposal within environmental limits 3.3. Measure and sample produced gas as required 3.4. Measure collected product to determine the level of available stocks for further transfer and for accounting purposes 3.5. Take appropriate action.
4. Transfer product.	4.1. Check transfer process equipment required to ensure it is working within agreed operating parameters 4.2. Transfer product to a processing facility for further treatment and enhancement 4.3. Monitor transfers and take appropriate action 4.4. Log and record all product transfers and communicate as required 4.5. Distribute data collected to appropriate personnel.
5. Isolate and de-isolate plant.	5.1. Isolate plant 5.2. Make safe for required work 5.3. Check plant is ready to be returned to service 5.4. Prepare plant for return to service.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
Competence includes the ability to isolate the causes of problems to an item of equipment within the compressor system and to be able to distinguish between causes of problems/alarm/fault indications such as: • product contamination • instrument failure/wrong reading • electrical failure • mechanical failure • operational problems • pressure losses and leakage.
Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE
The knowledge referred to in the Evidence Guide for this unit includes: • all items on a schematic of the remote system and the function of each • nature/condition of materials entering and leaving each stage of the process • changes which have occurred in that stage and why they have occurred • methods of changing production rates and the advantages and disadvantages of each • effect of specific climatic and environmental factors • water testing and gas break through testing techniques • storage and transfer techniques related to the transport of oil, gas or water. • principles of operation of plant/equipment • physics and chemistry relevant to the process unit and the fluids involved • process parameters and limits, eg temperature, pressure, flow, pH • duty of care obligations • hierarchy of control • communication protocols, eg radio, phone, computer, paper, permissions/authorities • routine problems, faults and their resolution • relevant alarms and actions • plant process idiosyncrasies • correct methods of starting, stopping, operating and controlling plant • corrective action appropriate to the problem cause • function and troubleshooting of major components and their problems • types and causes of problems within operator's scope of skill level and responsibility.

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for assessment of

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EVIDENCE GUIDE	
	parts of this unit. Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios, role plays and 3D virtual reality interactive systems. In the case of evacuation training or training for competencies practised in life threatening situations, simulation may be used for the bulk of the training. This unit of competency requires an application of the knowledge contained in the operation of the remote facility and its integral equipment, to the level needed to maintain control and recognise and resolve problems. This can be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster. Consistent performance should be demonstrated. In particular look to see that: • early warning signs of equipment/processes needing attention or with potential problems are recognised • the range of possible causes can be identified and analysed and the most likely cause determined • appropriate action is taken to ensure a timely return to full performance • obvious problems in related plant areas are recognised and an appropriate contribution made to their solution. These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.

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EVIDENCE GUIDE	
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	Consider co-assessment with other units relevant to the job.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This unit of competency includes all such items of equipment and unit operations which form part of the remote facility. For your enterprise this may include (select relevant items): • valves • pumps • prime movers • compressors • separators • instrumentation • storage tanks, ponds and dams • filters • wellheads

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RANGE STATEMENT	
	• hydraulic well control panels • fire and gas safety systems.
Typical problems	Typical problems for your plant may include: • contamination of product • control of temperature and pressure • variations in feed • vibration.
Appropriate action	Appropriate action includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person.
Procedures	Procedures may be written, verbal, computer-based or in some other form. They include: • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Responsible Care) and government regulations.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Operational/technical

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMAOPS411B Manage plant shutdown and restart

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the co-ordination of the shutdown and restarting of a production process in a safe and efficient manner due to a planned or an unplanned shutdown or emergency situation. It does not apply to individual plant operators shutting down individual production units or following directions during a shutdown, as this is included in the normal unit of competency for operating that production unit.

Application of the Unit

Application of the unit	In a typical scenario, a complex and integrated plant (usually but not necessarily large and continuous) needs to be shut down for some reason. Shutting down is a complex process and is more than the simple turning off of a switch. This competency would typically be exercised by the leading plant technician on a shift. This unit requires the exercise of discretion as the plant technician's responses are governed by the cause of the shutdown and the plant's responses to that. They are required to adapt normal practice, within the overall guidelines, to the current situation to obtain the best outcome. This competency requires the coordination of all personnel involved in the shutdown to ensure it happens in as orderly a fashion as possible and that the plant is left in the best condition possible for a quick restart. The person exercising this competency needs to balance the varying requirements to ensure the shutdown occurs with maximum safety to personnel, plant, the environment and the business's productivity (in that order).

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Manage shutdown sequence.	1.1. Check and verify safety systems to ensure that the unit has been made safe 1.2. Identify the reason for, or cause of the shutdown by troubleshooting the system and by utilising all available data and information systems 1.3. Obtain confirmation of the identified shutdown from field based operators to verify both the nature and the reliability of the shutdown 1.4. Rectify or initiate procedures to rectify the fault or shutdown cause through either repair of the operational fault or readjustment before returning the system to start-up status.
2. Conduct start-up process.	2.1. Satisfy all start-up permissives prior to start- up process being commenced 2.2. Conduct start-up according to procedures and in a safe and efficient manner, ensuring a return to steady state operation is achieved.
3. Document shutdown and	3.1. Complete all logs and workplace documentation relating to the shutdown/start-up process, ensuring all details, actions and

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ELEMENT	PERFORMANCE CRITERIA
start-up process.	responses are accurately recorded 3.2. Record any further ongoing production problems and report to appropriate persons or authority.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
Competence includes: • efficient and effective planning of shut down/start up • hazard analysis • completing plant records • communication • problem solving
Required knowledge
Demonstration of competence in this unit must include knowledge of the following: • principles of operation of plant/equipment • physics and chemistry relevant to the process unit and the materials processed • process parameters and limits, eg temperature, pressure, flow, pH • duty of care obligations • hierarchy of control • communication protocols, eg radio, phone, computer, paper, permissions/authorities • routine problems, faults and their resolution • relevant alarms and actions • plant process idiosyncrasies • all items on a schematic of the plant item and the function of each • correct methods of starting, stopping, operating and controlling process • corrective action appropriate to the problem cause • function and troubleshooting of major components and their problems • types and causes of problems within operator's scope of skill level and responsibility. • architecture of the process/production systems • the plant • product specifications and tolerances • systems operating parameters

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REQUIRED SKILLS AND KNOWLEDGE
• process control philosophies and strategies • the process • emergency shutdown procedures • physics, chemistry and mathematics relevant to the process • outside process knowledge and equipment operation as is relevant to the practical operation of equipment at that job level.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster. Consistent performance should be demonstrated. In particular look to see that: • early warning signs of equipment/processes needing attention or with potential problems are recognised • the range of possible causes can be identified and analysed and the most likely cause determined

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EVIDENCE GUIDE	
	• appropriate action is taken to ensure a timely return to full performance • obvious problems in related plant areas are recognised and an appropriate contribution made to their solution. These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units. In a major hazard facility, it may be appropriate to assess this unit concurrently with: • *MSAPMOHS200A Work safely*. The person undertaking this competency is expected to be able to work under and manage situations of high pressure, in order to ensure the safe and efficient management of the control room production process and the safety of plant employees.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

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RANGE STATEMENT	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	Causes of shutdown may be: • planned, eg for maintenance or other planned work • unplanned, eg in response to a plant upset or equipment failure • emergency, eg in response to an automatic shutdown sequence or plant trip. The shutdown may be: • shutdown 'to cold', eg complete plant shutdown and purging of all process materials from equipment • short shutdown to allow minor work 'warm shutdown', eg partial shutdown, with retention of some or all of process materials • managing a plant trip and restart 'hot shutdown', eg short duration shutdown in response to a plant upset or trip This competency also includes: • coordinating the shift team • implementing emergency procedures • using the permit to work system (for repairs required). • This competency may apply to: • panel technicians • outside technicians • technicians seconded to a shut down role • other relevant personnel All operations are performed according to procedures.
Appropriate action	Appropriate action includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person.
Procedures	Procedures may be written, verbal, computer-based or in some other form. They include: • all work instructions • standard operating procedures • formulas/recipes

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RANGE STATEMENT	
	• batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Responsible Care) and government regulations.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Operational/technical

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMAOPS450B Solve colour problems

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit applies a knowledge of colour to solving colour problems both for external customers and in the plant (ie colour is/appears to be wrong).

Application of the Unit

Application of the unit	In a typical scenario, a technician receives a complaint arising from either an external customer or an internal customer, such as a production manager or team leader. The complaint concerns colour which is not as the complainant expected it to be. The technician gathers the appropriate data, then makes an analysis as to the cause of the problem and makes recommendations as to how this problem might be rectified. The complaints may include: • the colour as made does not match the standard • the colour as provided does not match the standard • the colour initially appeared correct, but is now unsatisfactory. The technician would: • clarify the problem • analyse problem cause(s) • recommend a solution to the problem. Generally the technician would work alone for this unit, although the ability to communicate with all internal and external customers and stakeholders (simply referred to as 'customers') is vital.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Assist customer to articulate problem.	1.1. Clarify customer perception of problem 1.2. Assess opportunities for a targeted response to meet customer needs 1.3. Identify the rights and responsibilities of the customer and effectively communicate these to the customer 1.4. Clarify the history of the problem 1.5. Define problem and complete records.
2. Analyse possible problem cause(s).	2.1. Examine the colour of the object/surface and: 2.2. compare to standard to determine if colour faulty 2.3. determine potential causes if colour faulty 2.4. Analyse history of problem for potential causes 2.5. Question customer to clarify issues revealed by examination 2.6. Take samples and arrange for tests as appropriate 2.7. Determine range of possible causes consistent with data available 2.8. Determine most likely cause(s) of defined and observed

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ELEMENT	PERFORMANCE CRITERIA
	problem.
3. Satisfy customer needs.	3.1. Determine appropriate strategies and activities to resolve problem 3.2. Negotiate proposed solution with customers and other relevant parties 3.3. Identify potential areas of difficulty in customer service delivery and take appropriate actions to address them 3.4. Follow items initiated through until final resolution has occurred 3.5. Meet customer needs within the scope of area of responsibility 3.6. Report problems outside area of responsibility to designated person 3.7. Follow procedures where a decision is made to terminate a service 3.8. Complete reports to procedure.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
This competency requires the following skills: • communication • interrogation • observation • analysis
Required knowledge
Competence includes an understanding of colour and the interaction of colour components during processing and in application. A knowledge of the impact of weathering/aging on colour as appropriate to the product is also required. In particular it includes the ability to: • distinguish between colour variations caused by materials or processing errors • distinguish between colour variations caused by faulty surface preparation or application • interrogate customers to obtain all relevant information, but in a manner which is pleasing to the customer

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REQUIRED SKILLS AND KNOWLEDGE
• explain the causes of colour variation in a manner which will be understood and accepted by the customer • describe the causes and remedies of common problems such as those selected in the Range Statement.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment for this unit of competency will be using real or simulated colour problems. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include a range of colours, problem causes and environments. Simulation may be used for assessment of this unit of competency. Simulation should be based on the actual colour problems and should include the use of case studies/ scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what if scenarios.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to define and analyse the problem as well as deal with the customer. The customer should be satisfied with the solution, as well as the solution being technically sound. Consistent performance should be demonstrated. In particular look to see that: • different types of problems can be analysed and resolved • different types of customers can be satisfied • the range of possible causes can be identified and analysed and the most likely cause determined

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EVIDENCE GUIDE	
	• appropriate action is taken. These aspects may be best assessed using a range of scenarios/case studies/what-ifs. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past history and similar sources.
Context of and specific resources for assessment	Assessment will require a suitable method of gathering evidence of colour problem solving ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This unit of competency includes colour problems both in the plant and within the customer site (ie it includes both internal and external customers). This may include (select relevant items): • batches during manufacture do not conform to colour specification • colour as supplied to customer does not conform

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RANGE STATEMENT	
	• colour as applied to substrate does not conform • colour variation within the product • colour was initially satisfactory but has changed over time • other colour problem. Typical problem causes may include: • wrong colourant • wrong colourant amount • incorrect processing/mixing/dispersing • incorrect substrate preparation (eg of painted/printed surface) • incorrect application (eg of paint/ink) • incorrect colour measurement and testing • defect standard • process changes and variations.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit Sector	Operational/technical

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMAOPS500A Optimise production systems

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the application of in depth knowledge of process and plant to the optimisation of complex operating production systems.

Application of the Unit

Application of the unit	In a typical scenario, a senior technician reviews the operation of a complex production system or whole production plant, with a view to improving the efficiency of operation of the process to improve the yield, utilization of services or production of waste. The operation will be thoroughly reviewed by gathering data on usage patterns, production rates, operational practices and conditions with a view to determining areas of improvements or possible gains in efficiency or reductions in variability. Optimization is often a multi-pass process whereby the process is modified, reviewed and modified again as required. The stimulus for optimization is usually not in response to a problem, but a desire to improve the performance of an operating process. The corrective action may well be beyond the scope of competency and responsibility of the senior technician to implement. Typical systems optimisations may include: • utilisation of services across a production facility • variability of product properties produced from a multi-line batch reaction process • variability of plant performance from shift to shift, day to day, week to week The senior technician would: • gather historical plant operating or product quality data • review the data for trends or dependencies • investigate cause and effect responses • recommend a solution to the problem. Generally the technician would work alone for this unit, although the ability to communicate with all internal and external stakeholders is vital.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify process or system for review.	1.1. Review process or plant performance to determine likely areas of improvement. 1.2. Gather data on the process or system design 1.3. Design the data collection system for the required data.
2. Collect and analyse data.	2.1. Collect or review available data from the process or plant 2.2. Analyse the data for trends or dependencies 2.3. Postulate possible cause and effect scenarios
3. Develop tests or trials.	3.1. Propose controlled tests or trials to review the plant or process patterns

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ELEMENT	PERFORMANCE CRITERIA
	3.2. Discuss possible solutions to cause with relevant people 3.3. Arrange for required tests or controls to be undertaken in appropriate time frame 3.4. Collect further data from tests or trials 3.5. Review plant or process data and compare with original data. 3.6. Prepare further tests or trials as required, or until possible solutions are developed.
4. Develop improvement solution	4.1. Agree required improvement solution with appropriate people 4.2. Arrange for required improvement solution to be undertaken in appropriate time frame 4.3. Follow items initiated through until final resolution has occurred 4.4. Check effectiveness of solution and take appropriate action 4.5. Complete reports to procedure.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
This unit requires skills of: • data collection and analysis • problem solving for multi-variable processes • negotiation • communication • basic mathematics
Required knowledge
Competence includes a deep understanding of: • plant equipment, its characteristics and limitations • impact of variations in plant/process and the distinctive signs of each variation • process chemistry, physics and biochemistry as relevant (eg to the extent of writing chemical equations and identifying factors controlling reaction rate and yield or

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REQUIRED SKILLS AND KNOWLEDGE
equivalent, or determining mass or heat transfer rates for a process) • problem isolation techniques • problem analysis techniques • organisation approval processes

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include a range of problems, problem causes and environments. Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual problems and should include the use of case studies/ scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to define and analyse the problem as well as deal with the stakeholders. The stakeholders should be satisfied with the solution, as well as the solution being technically sound. Consistent performance should be demonstrated. In particular look to see that: • different types of processes or plant units can be analysed and resolved • different types of stakeholders can be satisfied • the range of possible causes can be identified and

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EVIDENCE GUIDE	
	analysed and the most likely cause determined • appropriate action is taken. These aspects may be best assessed using a range of scenarios/case studies/what-ifs. These assessment activities should include a range of optimisation projects which may have been generated from the past history and similar sources.
Context of and specific resources for assessment	Assessment will require a suitable method of gathering evidence of problem solving ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This unit of competency includes reviews of the plant, plant equipment or process which may make itself evident through desire for improved quality, higher yields, less waste or better control.
Health, safety	All operations to which this unit applies are subject to stringent health,

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RANGE STATEMENT	
and environment (**HSE**)	safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Operational/technical

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMAOPS550B Develop a colour formulation

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the development of a new formulation, suitable for production, of a colour to match a sample/customer requirements. It includes both computer and visual colour matching and the adjustment of a computer suggested formulation to suit company conditions and standard materials/colourants.

Application of the Unit

Application of the unit	In a typical scenario, a technologist is given a colour sample, or colour description, and needs to develop a formulation. The formulation would be suitable for production by the company and produce a final product which meets the colour requirements of the customer. The development would include factory trials and modifications to the formulation. Typically the development will be of a new colour for an existing product of another colour. It may include the colour aspects (only) of developing a totally new product. This unit does not include the development of any aspect of the product other than its colour. The technologist would: • identify potential manufacturing problems associated with the colour formulation and propose/implement solutions • analyse the production trials from the standpoint of the desired colour and the impact of the colour requirements on the production process and make modifications to ensure a product of stable colour and suitable manufacturing process. Generally the technologist would be part of a team for the total development of a new product, but may develop the colour formulation for a new colour for an existing product independently. The technologist would liaise with relevant production and other personnel for production trials.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*PMAOPS350B*	*Match and adjust colour*
	PMAOPS450B	*Solve colour problems*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Confirm design brief of new colour.	1.1. Communicate with customer and other key stakeholders and agree on: 1.1.1. colour/colour specification 1.1.2. surface finish/gloss 1.1.3. viewing conditions (lighting) 1.1.4. opacity 1.1.5. requirements for metameric/non-metameric match 1.1.6. other aesthetic requirements 1.2. Determine end use of product, eg interior, exterior, automotive 1.3. Develop and validate design brief to meet needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Determine initial colour formulation.	2.1. Analyse colour sample (where provided) using colour computer and/or eye and predict possible colour formulation 2.2. Compare predicted formulation with company/customer preferred colourants. 2.3. Adjust predicted formulation to use preferred colourants. 2.4. Check that the adjusted formulation complies with design brief.
3. Conduct small scale trials.	3.1. Make/arrange for small batch to adjusted formulation 3.2. Undertake trials to determine optimum processing conditions where relevant 3.3. Analyse colour of sample product and compare to design brief 3.4. Modify formulation and processing (where relevant) to have simplicity of manufacture and to meet brief.
4. Assess hazards.	4.1. Identify hazards arising from colour formulation and processing 4.2. Assess risks arising from those hazards 4.3. Determine appropriate action to control risks in accordance with hierarchy of control and duty of care 4.4. Take required action before proceeding to trial.
5. Trial new colour formulation through the process.	5.1. Design trial to procedure to deliver required information 5.2. Ensure OHS and environmental requirements are stringently observed 5.3. Coordinate the trialing of the new product 5.4. Interpret colour trial results and guide colour trial process 5.5. Adjust formulation, and if appropriate tune process, to optimise production of new colour.
6. Coordinate evaluation and testing.	6.1. Determine colour testing and evaluation regime required to meet end use requirements, including regulatory/industry code requirements 6.2. Arrange for testing and evaluation of trial colour 6.3. Interpret colour trial results 6.4. Modify formulation and conduct new trials as required 6.5. Determine final formulation and processing specifications.
7. Implement procedures for new colour.	7.1. Monitor initial production and adjust process, conditions and formulation to make the process a smooth operation 7.2. Ensure process specifications reflect the optimised operation developed 7.3. Ensure quality standards and procedures meet requirements

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ELEMENT	PERFORMANCE CRITERIA
	of design brief 7.4. Ensure procedures are correct for the new colour 7.5. Ensure project records are complete and all required reports have been completed and submitted 7.6. Archive records according to procedure.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
This competency requires skills of: • communication • interrogation • observation • analysis
Required knowledge
Competence includes an understanding of colour, the interaction of colourants and the impacts of processing variables on the final colour of then product. In particular it includes the ability where relevant to: • interpret the 'flare path' on a tonal graph of tone vs time • choose the optimum grind/particle size for the required colour • balance gloss, opacity and tone • substitute colourants recommended from a 'computer match' for other colourants • make both metameric and non-metameric matches • determine the hazards arising from the colourants chosen • interpret weathering and other test data relevant to colour and the use of colour • describe the causes and remedies of common problems such as those selected in the Range Statement. Competence also includes the ability to isolate the causes of problems to an item of equipment within the compressor system and to be able to distinguish between causes of problems such as: • wrong colourant • wrong colourant amount • wrong grind time/particle size

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REQUIRED SKILLS AND KNOWLEDGE
• wrong wetting/dispersing.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment for this unit of competency will be by developing colour formulations in a plant, laboratory or other relevant context. Assessment will occur over a range of situations which will include different design briefs. Simulation may be required for assessment of this unit of competency. Simulation should be based on actual colour formulation developments. Simulations may also include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the predicting possible problems and determining actions required to avoid the difficulty. Consistent performance should be demonstrated. In particular look to see that: • predicted colour formulations are reasonable • adjustments to formulations are made based on a rational interpretation of the results and an understanding of colour and the process These aspects may be best assessed using a range of colour formulation development projects backed up by scenarios/case studies/what-ifs. These assessment activities should include a range of problems, including new, unusual and improbable situations

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EVIDENCE GUIDE	
	which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.
Context of and specific resources for assessment	Assessment will require a suitable method of gathering evidence of colour formulation ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This unit of competency covers the development of a new colour formulation 'from scratch', usually based on a provided colour sample. The formulation would normally use colourants already available within the company (preferred colourants), but does not preclude the use of colourants which are novel/new to the company. It may be applied to any industry sector requiring the development of a new colour formulation such as: • paint

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RANGE STATEMENT	
	• ink • plastics • rubber • concrete products • glass products • clay/ceramic products.
Typical problems	Typical problems may include: • matching under different lighting conditions • variable surface finish/gloss level • non-metameric matching • process caused colour differences.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Operational/technical

Competency field

Competency field	

Co-requisite units

Co-requisite units	

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PMAOPS600C Modify plant

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the process specification, selection or management of the equipment and supervision of the installation and commissioning of the modification to a plant.

Application of the Unit

Application of the unit	In a typical scenario, it has been identified that modifications need to be made to the plant, and equipment needs to be chosen to undertake these modifications. The identification of the need for modification is not part of this unit, and it may have arisen from any number of possible sources. This competency does not require the design of equipment (which would typically be an engineering role), but does require the process specification of the equipment and the matching of performance specifications of off-the-shelf and/or tendered equipment to the required specification. It also requires the selection of the most appropriate item. This competency assumes that the technician responsible for these modifications takes the overall responsibility for the modifications, but would work with the support of other company and external experts. This extends to the coordination of the installation of the modified equipment. This unit does not cover the optimisation of plant by modification of process, procedures or practice (*see MSAPMOPS400A Optimise process/plant area*) as it is to do with the modification of plant hardware. This unit does not cover work requiring special certification (eg registered structural engineer) but may include working with such people and providing process and product expertise.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Confirm required outcomes from modification.	1.1. Communicate with relevant technical, operational and other key personnel, to determine operational and technical requirements of the plant modification. 1.2. Determine regulatory/industry code requirements 1.3. Obtain relevant drawings of existing plant 1.4. Develop modification brief, including relevant plant schematic sketch, to meet needs 1.5. Establish required performance measures to indicate success of project 1.6. Obtain 'sign off' on modification brief from all relevant persons.
2. Short list possible modifications to meet brief.	2.1. Investigate the range of available equipment/plant units 2.2. Determine relative advantages and disadvantages of each class of equipment/type of modification which may provide a solution

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Compile a shortlist of modification types/equipment classes which will best meet the modification brief 2.4. Discuss shortlist alternatives with relevant stakeholders and obtain 'sign off' for the chosen approach.
3. Select technically best equipment/unit/modification.	3.1. Complete technical specification for required modification incorporating feedback received 3.2. Compare specification with that of 'off the shelf' equipment where appropriate 3.3. Arrange for equipment suppliers to tender to the specification where necessary, following company procedures 3.4. Rank competing items by their compliance with the technical specification.
4. Compare hazard profile of possible modifications.	4.1. Organise a hazard analysis (eg HAZOP) for the modification according to company procedures 4.2. Ensure that all stakeholders are represented on the hazard analysis team 4.3. Brief the hazard analysis team on the modification and the alternatives under evaluation 4.4. Eliminate alternatives which do not meet hazard requirements 4.5. Rank remaining competing items by safety performance.
5. Make final choice of solution.	5.1. Evaluate competing items by their economic performance (eg, life, maintenance, running costs) and rank by total lifetime cost 5.2. Seek further information where necessary to allow a rational selection to be made 5.3. Choose the modification which meets all required minimum standards and will provide the best solution 5.4. Verify choice in discussion with production and engineering managers and other key stakeholders 5.5. Arrange for order to be placed, following company procedures.
6. Check and commission modification.	6.1. Undertake pre-commissioning activities 6.2. Complete safety acceptance documentation 6.3. Identify, record and report problems or non-conformances

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ELEMENT	PERFORMANCE CRITERIA
	6.4. Conduct trials/test runs 6.5. Record and report performance data 6.6. Bring the plant/plant systems/pipeline on line.
7. Complete modification.	7.1. Evaluate performance of modification 7.2. Make adjustments as required 7.3. Accept (or otherwise) the equipment/unit (and ensure payment flows) 7.4. Ensure plant procedures and training material updated 7.5. Ensure plant drawings and engineering specifications are updated 7.6. Complete all other required paperwork.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
Competence includes the ability to read and interpret: • plant schematics (eg P&IDs, PFDs, instrument and process diagrams) • construction or layout drawings equipment designs, specifications and manufacturer data Discuss and negotiate with other appropriate personnel to agree necessary and desirable: • technical requirements • operations requirements • timelines • cost and other requirements
Required knowledge
Demonstration of competence in this unit must include knowledge of the following: • the operations of the plant and each major unit in it • the principles of operation of the equipment being investigated to the extent required to interpret technical specifications in a meaningful manner • the basics of plant economics and whole of life costing • hazard analysis principles (while it is beneficial, it is not expected that the candidate will

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REQUIRED SKILLS AND KNOWLEDGE
be able to undertake HAZOP (or similar) analyses but will understand basic principles and be able to interpret and use the outcomes) • typical hazards with the type of equipment being investigated • OHS legislative requirements related to plant including registration and documentation requirements related to modification of registered plant

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to specify the requirements and then select the best solution to meet the necessary and desirable requirements. In particular look to see that: • safety, technical and economic aspects are all considered

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EVIDENCE GUIDE	
	• the decision made can be justified on those criteria • all key stakeholders are kept well informed and agree with the decisions • the modification, and particularly its timelines, are a good fit for the overall plant requirements • obvious problems in related plant areas are recognised and an appropriate contribution made to their solution. This will typically be assessed by a modification project on an operating plant. One complex project, or a number of simple projects, are required to demonstrate competence.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units. It may be appropriate to assess this unit concurrently with: • *PMASUP410B Develop plant documentation* • *MSAPMOHS401A Assess risk*.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the

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RANGE STATEMENT	
candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	The need for the modification may arise from a continuous improvement project, as a result of an analysis of plant performance or from any other source. The modification may require the selection of any number of items of equipment such as: • pumps • heat exchangers • mixers • separators • columns • reaction kettles. • Classes of equipment (see Element 2) means the selection between different members of an overall class such as: • heat exchangers - various types of shell and tube, plate etc • mixers - propellers, impellors, jet mixing etc • packed columns - rings, saddles etc • kettles - jacketed, coiled etc. Required minimum standards include: • OHS legislative requirements related to plant • industry and enterprise OHS standards • enterprise standards related to maintenance • output requirements • economic performance
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Operational/technical

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMASUP410B Develop plant documentation

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the development, establishment and evaluation of plant documentation in response to identified information requirements including the development of workplace documents for the introduction of new systems, processes, equipment and record keeping requirements. The competency unit applies to a wide range of plant documentation. This unit does not apply to the participation in reviewing workplace documentation, which is covered by *MSAPMSUP210A Process and record information*.

Application of the Unit

Application of the unit	Typically, the employee would: • investigate the need for new plant documentation • determine operating principles and best practice in consultation with others • draft plant documentation • validate and modify plant documentation in response to feedback • communicate changes and amendments.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify information need/deficiency.	1.1. Identify the need for documentation in accordance with company requirements 1.2. Evaluate current documentation where existent 1.3. Define information need/deficiency 1.4. Discuss information requirements with appropriate personnel.
2. Develop plant documentation.	2.1. Specify information need and set/prioritise objectives 2.2. Analyse existing documentation/records in accordance with specified requirements 2.3. Determine operating principles and best practice where required 2.4. Develop/amend documentation as a draft in accordance with specifications to standard format 2.5. Issue documentation to appropriate personnel for review 2.6. Edit documentation and amend in accordance with review requirements 2.7. Complete documentation to satisfy the initial identified need/deficiency.
3. Communicate changes to plant documentation.	3.1. Explain and communicate documentation to all relevant personnel 3.2. Distribute documentation to all appropriate personnel 3.3. Evaluate implementation of documentation

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ELEMENT	PERFORMANCE CRITERIA
	3.4. Amend documents if required.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
Competence, sufficient to be able to develop and amend work place documentation, includes the ability to apply and explain: • enterprise information systems and work place documentation • enterprise quality and safety procedures • principles of policy and procedure development • principles of information/data management • importance of effective consultation in developing documentation • relevant equipment and operational processes.
Required knowledge
The knowledge referred to in the Evidence Guide for this unit includes: • organisation policies, standard procedures and work instructions and relevant regulatory requirements for the development of plant documentation • standard codes of practice relevant to developing plant documentation.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency.

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	Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Assessment will typically use a plant documentation development project. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of satisfactory performance in this unit can be obtained by observation of performance and questioning to indicate understanding and knowledge of the Elements of the competency and Performance Criteria. Consistent performance should be demonstrated. In particular look to see that: • effective maintenance and evaluation of workplace documentation is carried out • effective research and consultation is undertaken to ensure the development of best practice documentation • feedback is provided on how to improve workplace documentation • completed documentation is user friendly, accurate and in accordance with the intended use/requirements • adequate documentation is produced, including documentation for the introduction of new systems, policies, equipment or processes • non routine problems in relation to plant documentation are recognised and appropriate solutions are presented • changes to workplace documentation is communicated in the appropriate manner. These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the

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	past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This competency is typically performed by experienced operators, team leaders or supervisors who may be working individually or in a team environment.
Documentation	This competency includes the following indicative plant documentation: • operating procedures • work instructions • incident procedures • operating manuals • quality manuals and procedures

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RANGE STATEMENT	
	• training program contents/materials • safety data sheets • job cards • maintenance logs • non-compliance reports • incidence and accident reports • permits • schematics/process flows/engineering drawings.
Information	Sources of information may include: • manufacturing specifications • product specifications • company policies and procedures • customer requirements • industry/work place codes of practice • State/industry OHS legislation and regulations • ISO and other industry standards and regulations • industry associations, networks and professional bodies.
Equipment	Items of equipment for this competency include: • computer equipment.
Procedures	Procedures may be written, verbal, computer-based or in some other form. They include: • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Responsible Care) and government regulations.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

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Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMASUP420B Minimise environmental impact of process

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers minimising waste and environmental threats from a plant and/or a process. It covers all resources used and products made by the plant, and is performed by more experienced operators who might be expected to develop and implement improvements to processes within the plant. This unit may be performed individually or as part of a team. This competency also applies to capital projects, as well as improvements brought about by changes in work practices and procedures

Application of the Unit

Application of the unit	In this competency, an operator would develop practices or procedures for: • conserving resources • minimising pollution • minimising waste. This requires the operator to have a good understanding of the resources used by the plant, the nature and source of pollutants and the waste materials produced by the plant. It also requires the operator to understand the impact of using resources, and the effect pollutants and waste can have on the local environment. When developing a process or practice, the operator would identify which resource, pollutant or waste product that if reduced would give the most benefit. After developing procedures to conserve resources or minimise pollution/waste produced by the plant, the operator would then document the procedures to implement the changes.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Develop resource conservation practices and/or procedures.	1.1. Identify the nature of resources used in the plant/process 1.2. Determine the primary source of these resources 1.3. Describe the impact of the depletion of these resources on the environment and society 1.4. Determine which resource(s) will yield a greater benefit from their conservation 1.5. Develop methods to reduce the consumption of these resources 1.6. Complete required documentation to implement change
2. Develop pollution minimisation practices and/or procedures.	2.1. Identify the nature of pollutants produced by the plant/process 2.2. Determine the source(s) of these pollutants within the plant/process 2.3. Describe the impact of these pollutants on the environment and society 2.4. Determine which pollutant(s) will yield a

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ELEMENT	PERFORMANCE CRITERIA
	greater benefit from their reduction 2.5. Develop methods to reduce the production of this pollutant 2.6. Complete required documentation to implement change.
3. Develop waste minimisation practices and/or procedures.	3.1. Identify the nature of wastes produced by the plant/process 3.2. Determine the source(s) of these wastes within the plant/process 3.3. Describe the impact of these wastes on the environment and society 3.4. Determine which waste(s) will yield a greater benefit from their reduction 3.5. Develop methods to reduce the production of this waste 3.6. Complete required documentation to implement change.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
Competence to also include the ability to apply and explain: • nature and severity of potential environmental hazards caused by the plant/process • sensitivity of local environment to these environmental threats • pathways of entry to the environment from the plant • regulatory requirements such as environment protection regulations, OHS, HAZCHEM, duty of care, dangerous goods • external licensing requirements such as EPA, water authorities, local councils • enterprise procedures and practices.
Required knowledge
Knowledge and understanding of the control of environmental incident process and the importance of critical parameters enough to minimise waste and environmental threats from a plant and/or a process within an organisation.

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Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Assessment of this unit may be best achieved with a suitable project. This will minimise possible impact on the environment caused by the process or some aspect of the process. Such a project may be regarded as adequate provided it meets all the Performance Criteria of at least one Element. It is not necessary to cover all elements. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster. Consistent performance should be demonstrated. In particular look to see that: • procedures are developed to reduce the consumption of resources, or to minimise pollution and/or waste products • appropriate documentation is completed to

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	implement changes • the greatest yield is achieved by appropriate selection of type of resource usage, type of pollutant or waste product. These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units. Consider co-assessment with: • Competency units relevant to the type of process equipment. In a major hazard facility, it may be appropriate to assess this unit concurrently with OHS units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may

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RANGE STATEMENT	
be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This competency is performed by more experienced operators and may be performed individually or as part of a team. It includes the following indicative functions: • examining plant records • examining operating procedures and practices • liaising with a range of internal people • modifying/updating standard operating procedures to 'lock in' any changes. Typical objectives will include: • minimisation of waste • maximisation of product yield from raw materials • reduction in volume of pollutants made • reduction in concentration/intensity of pollutants made • reduction in emissions. All operations are performed in accordance with standard procedures and policies.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

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Co-requisite units

Co-requisite units	

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PMASUP432B Coordinate pipeline projects

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	In a typical scenario, the person is involved in the efficient coordination of projects on pipeline systems and facilities. Typical projects may include: • installation of new plant piping and equipment • pipeline repairs and modifications • upgrades of existing plant, piping and equipment • commissioning of pipelines and facilities • construction and upgrade of pipeline easements.

Application of the Unit

Application of the unit	The person would: • prepare scoping documents, specifications and/or tenders • manage the project through the construction and commissioning phases • liaise with other staff, contractors, and authorities as required • ensure that the project conforms with all of the necessary safety requirements. Generally the person would be part of a team during the whole project and would perform all parts of this unit. At all times they would be liaising and cooperating with other members of the team. This unit does not require the operation of a central control panel.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare project specification documents.	1.1. Analyse the proposed project to establish contract specifications 1.2. Conduct a documented hazard and risk assessment on the proposed project, identifying all potential hazards and risks 1.3. Draft specification documents stating the required work activity and health, safety and environmental requirements 1.4. Seek tenders for the specified works, review as per the relevant company procedure and appoint a winning tenderer.
2. Prepare project schedule and documentation.	2.1. Draft a project schedule to establish project timeframe, work activities and procurement of materials 2.2. Apply the job safety analysis process to specific project activities reflecting any health, safety and environmental issues identified in the project risk and hazard assessment 2.3. Write procedures and work instructions for project work activities from the outcome of the job safety analysis process.
3. Conduct induction training for project.	3.1. Discuss company/site specific procedures and health, safety and environmental requirements with contractors/employees

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ELEMENT	PERFORMANCE CRITERIA
	carrying out the specified works 3.2. Assess all persons who are inducted to ensure they understand the company/site procedures and health, safety and environmental requirements 3.3. Inspect all equipment and machinery utilised to carry out the works to ensure these comply with company/site requirements.
4. Monitor progress of project.	4.1. Purchase materials required for fabrication and installation on the project and inspect to ensure all items meet project specifications 4.2. Monitor project works to ensure activities are carried out to project specification and minimal impact occurs on existing operations and environment 4.3. Issue permits to work where project activities impact on existing pipeline operations 4.4. Amend and/or modify original specifications and communicate to all parties involved as per the relevant company procedure 4.5. Produce project reports updating project schedule progress, activities and health, safety and environmental issues, and discuss with all parties involved 4.6. Draft operations manuals and compile vendor data manuals to assist in the operation of the equipment/facility after project completion.
5. Complete and commission project.	5.1. Commission the project to ensure all work carried out meets project specifications and operational requirements 5.2. Restore the project site to meet environmental and operational requirements 5.3. Cancel permits to work and sign off at completion of works 5.4. Check all documentation, records and drawings pertaining to the project, verify for accuracy and hand over to the relevant operational department.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE
The ability to coordinate project activities and report on project status would be considered as a critical component of this unit.
Required knowledge
Demonstrated working knowledge and application of company-specific work organisations and workflow would be highly regarded. Demonstrated knowledge of process and pipeline equipment is essential in underpinning a person's competency in this unit including: • architecture of pipeline systems and facilities • pipeline operations knowledge • pipeline system operating parameters • quality assurance systems and plans • emergency response plans and procedures.

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Assessment for this unit of competency will be using a pipeline project. Where it is not appropriate to use an actual pipeline project, then a simulated project may be used. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on an actual project and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through

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	questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster. Consistent performance should be demonstrated. In particular look to see that: • early warning signs of items needing attention or with potential problems are recognised • the range of possible causes can be identified and analysed and the most likely cause determined • appropriate action is taken to ensure a timely return to plan. These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the plant, incidents on similar plants
Context of and specific resources for assessment	Assessment will require access to a project over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork, OHS and communication units. Consider co-assessment with: • *PMASUP242B Monitor pipeline civil works* • *PMASUP241B Maintain pipeline easements*.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the

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	work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context	This competency includes all of the interactions necessary to plan, implement and complete a pipeline project, including the following aspects:
	• Provision of legislative requirements and information:
	  • OHS laws and codes of practice
	  • guidelines for preparation and submission of safety cases
	  • pipeline licenses
	  • environmental statutes and standards.
	The use and operation of personal computers, other hardware mediums and associated software is required.

Authorities	Authorities may include: • Environmental Protection Authority (EPA) • Department of Primary Industry and Energy (DOPIE) • Departments of Minerals and Energy State and Territory • Worksafe.
Inspection and testing	Inspection and testing techniques may include: • hydrostatic testing • magnetic particle inspection • radiography • ultrasonic inspection • dye penetrant inspection.
Repair/modification	Repair/modification techniques may include:

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RANGE STATEMENT	
techniques	• hot tap and stoppling operations • welding and cutting operations.
Reports	Reports may include: • budget updates • hazard and incident reports • safety statistics report • project schedule progress report • materials and spares listings.
Australian standards	Applicable Australian standards may include: • AS 2885 • AS 4041 • AS 3000.
Plans and drawings	Plans and drawings may include: • pipeline alignment drawings • process and instrument drawings • workshop fabrication drawings.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

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Co-requisite units

Co-requisite units	

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PMASUP440B Commission/recommission plant

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the commissioning of new plant/pipeline or the re-commissioning of significantly modified plant/pipeline. This unit does not cover startup of a plant/ pipeline after a shutdown, unless there have been major changes to the plant during the shutdown. For a normal startup use *PMAOPS411B Manage plant shutdown and restart*.

Application of the Unit

Application of the unit	In a typical scenario, a new plant/pipeline or a major plant/pipeline upgrade is to be commissioned/recommissioned with a leading plant technician taking a significant role. The technician is involved in the design of the plant/plant modifications and the planning of the startup. Being 'involved in' could mean participating in design meetings or HAZOPS or reviewing/checking the design for operability issues or checking the HAZOP outcomes. This does not preclude the inclusion of 'turnkey' type projects, provided the technician has had a role in the plant design, eg checking operability, suitability for local conditions. This competency includes all equipment associated with the new/modified plant. The technician would not normally have a 'hands on' operating role for all items of equipment, but may have a 'hands on' role for major items of equipment. More importantly, the technician will have an overall role and would be expected to have an understanding of the function of all items of equipment in the plant so that detailed directions can be given plant operators who are performing the 'hands on' role during the commissioning/recommissioning. This competency is typically performed by experienced technicians, likely to be the leaders of an operational team. This may include working in conjunction with a design team, or reviewing final design to ensure plant/ pipeline meets operational requirements and for the purpose of commissioning or recommissioning plant/pipelines. As commissioning is usually a team activity, the technician will take a lead technical role, rather than undertake all aspects on an individual basis.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Contribute to/review the design of plant/ equipment.	1.1. Apply process understanding to the design process 1.2. Identify the role and purpose of the plant and equipment 1.3. Ensure design meets the identified need 1.4. Identify process conditions and apply to hazard and operability studies 1.5. Undertake investigations following hazard studies 1.6. Record and report findings.
2. Take part in commissioning planning.	2.1. Ensure the work is coordinated effectively with others involved on the work site 2.2. Obtain materials necessary to complete the work and check against job requirements

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Obtain tools and equipment necessary to carry out the work and check for correct operation and safety 2.4. Prepare plans to ensure that procedures are performed in the correct sequence 2.5. Obtain approvals where necessary from appropriate authorities.
3. Participate in acceptance of plant/ equipment.	3.1. Undertake pre-commissioning activities 3.2. Complete safety acceptance documentation 3.3. Identify, record and report problems or non-conformance 3.4. Conduct trials/test runs 3.5. Record and report performance data.
4. Commission system.	4.1. Bring the plant/plant systems/pipeline on line 4.2. Make and report adjustments 4.3. Prepare reports in accordance with legislative and company requirements to maintain the historical record.
5. Evaluate results and identify modifications.	5.1. Identify modifications and improvements required 5.2. Check specifications, procedures and training material match the final system/procedures 5.3. Complete documentation and report to appropriate personnel.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
• hazard analysis • completing plant records • communication • problem solving.
Required knowledge
Competence to include the ability to apply and explain: • HAZOP (or similar) study process and the interpretation of findings

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REQUIRED SKILLS AND KNOWLEDGE

• results and impact of a HAZAN (or similar) study
• the process of hazard identification, risk assessment and control
• hierarchy of control
• sources of hazard information (such as Material Safety Data Sheets)
• principles of operation of equipment
• interpretation of design drawings, schematics and manuals
• physics and chemistry relevant to the plant and the materials processed or produced
• process parameters and limits, eg temperature, pressure, flow, pH
• duty of care obligations
• expected problems, faults and their resolution
• possible alarms and actions
• any known or expected plant process idiosyncrasies
• all items on a schematic of the plant and the function of each
• correct methods of starting, stopping, operating and controlling process
• corrective action appropriate to the problem cause
• function and troubleshooting of major components and their problems
• types and causes of problems to be expected
• principles of operation of instrumentation
• principles of basic control systems
• distinguish between the following problem sources, and their avoidance:
  • chemical
  • instrument
  • equipment (electrical/mechanical)
  • maintenance.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Simulation may be required to allow for assessment

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EVIDENCE GUIDE	
	of parts of this unit. It is possible that a simulation will be required to ensure that the technician is competent before taking a significant role in a commissioning activity. Commissioning is an infrequent and often frenetic activity and so it may not be practical or equitable to wait for an actual commissioning to occur to use this as the basis for assessment. Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/ scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster. Consistent performance should be demonstrated. In particular look to see that: • potential problems are recognised • the range of possible causes can be identified and analysed and the most likely cause determined • appropriate action is taken to ensure commissioning stays on schedule • obvious problems in related plant areas are recognised and an appropriate contribution made to their solution. These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.

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EVIDENCE GUIDE	
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units. In a major hazard facility, it may be appropriate to assess this unit concurrently with relevant OHS units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Appropriate authorities	Appropriate authorities may include: • local councils • road authority • sewerage and stormwater authorities • providers of services such as electricity, water and telephones.
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Plant	Plant covers on or off shore plant, well heads and also transmission pipelines or similar.

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RANGE STATEMENT	
Commissioning	Commissioning refers to the start-up of a new plant or plant unit and the associated equipment for the first time.
Commissioning/re-commissioning activities	Commissioning/recommissioning activities may include: • trial running of equipment • use of trial materials in plant • safe introduction of process materials to plant • producing product within specification • bringing plant to design rates • solving operational problems • disposal of waste generated in the start-up.
Documentation	Documentation may include: • operating procedures • OHS and environmental legislative requirements • manufacturer specifications • appropriate authority approvals • quality assurance inspection and test reports.
Health, safety and environment (HSE)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.
Plant/pipeline systems	Plant/pipeline systems may include: • pipes • valves • operating units • electrical and electronic components • PLCs/DCS control (programmable logic controllers, distributed control systems) or other plant controls • cathodic protection • pressure/flow/temperature etc regulation and meters.
Pre-commissioning	Pre-commissioning activities may include: • checking plant is built to design • ensuring plant is safe to operate

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RANGE STATEMENT	
	• ensuring plant area is clean and clear of debris • ensuring the plant internals are clean and clear of debris • functional checking of equipment and ancillaries.
Procedures	All operations are performed in accordance with standard operating procedures. Procedures may be written, verbal, computer-based or in some other form. They include: • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Responsible Care) and government regulations.

Recommissioning	Recommissioning refers to the start-up of an existing plant following major modifications, rebuild or reconfiguration.
	This competency unit includes functions such as :
	• liaison with relevant personnel such as manufacturers, engineering personnel, designers, contractors and maintenance and other company personnel
	• participation in/reviewing of hazard studies, which may include:
	  • hazard and operability studies (HAZOP)
	  • hazard analysis studies (HAZAN)
	• participation in/reviewing of design or modification plans

Tools, **materials and equipment**	Tools, materials and equipment may include: • hand tools, including power operated • other power operated tools • plant • emergency equipment • electrical and electronic test equipment

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RANGE STATEMENT	
	• gas detectors • air compressor • water pump.

Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMASUP441C Decommission plant

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the decommissioning of an existing plant/pipeline or major plant area, and its associated equipment. Decommissioning refers to the removal from service of plant/pipeline and equipment and its storage/'mothballing' or disposal. This unit does not cover the shutdown of a plant/pipeline - use *PMAOPS411B Manage plant shutdown and restart*.

Application of the Unit

Application of the unit	In a typical scenario, an existing plant/pipeline or major plant area, and its associated equipment, are planned to be taken out of service. The experienced technician organizes the systematic shutdown, cleaning out and preparation for safe 'moth-balling' all of the plant and equipment. This competency is typically performed by experienced technicians, likely to be the leaders of an operational team, usually working in conjunction with a decommissioning team, for the purpose of decommissioning plant/pipelines. As decommissioning is usually a team activity, the technician will take a lead technical role, rather than undertake all aspects on an individual basis. Much of the activity of successful decommissioning is in planning the activity and then supervising the work to ensure it is done safely and efficiently with no environmental damage. The technician may have no 'hands-on' role at all.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Contribute to decommissioning planning.	1.1. Apply process understanding to the planning process 1.2. Identify the role and purpose of the plant and equipment 1.3. Ensure the work is coordinated effectively with others involved on the work site 1.4. Identify process conditions and apply to hazard studies 1.5. Undertake investigations following on from hazard studies 1.6. Obtain materials necessary to complete the work and check against job requirements 1.7. Obtain tools and equipment necessary to carry out the work and check for correct operation and safety 1.8. Prepare plans to ensure that procedures are performed in the correct sequence 1.9. Obtain approvals where necessary from appropriate authorities to ensure decommissioning process proceeds in accordance with the plan. 1.10. Complete all appropriate documentation.
2. Isolate and decontaminate equipment/unit.	2.1. Interpret and apply decommissioning plan 2.2. Identify and use appropriate safety equipment and materials 2.3. Isolate and decontaminate equipment components as required 2.4. Dispose of contaminated materials or components as

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ELEMENT	PERFORMANCE CRITERIA
	required 2.5. Complete required documentation.
3. Inspect, test and notify completion of work.	3.1. Select tools and equipment appropriate to the testing/ inspection requirements and utilise in accordance with manufacturer specifications and legislative requirements 3.2. Test/inspect in accordance with requirements 3.3. Ensure compliance with OHS legislative requirements for risk assessment prior to disposal 3.4. Ensure any required additional work is undertaken/initiated 3.5. Notify work completion.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
Demonstrated knowledge and ability to: • plan the decommissioning process • arrange resources as required • coordinate own work and the work of others, including on-site contractors/operators • interpret and solve operational problems as they arise and take appropriate action • document the decommissioning and recommendations for safe storage/maintenance/disposal.
Required knowledge
Competence to include the ability to apply and explain: • chemistry of materials involved • principles of operation of the process • principles of operation of the equipment involved • all items on a schematic of the plant and the function of each • correct methods of, stopping plant items • function of major components • HAZOP study process and the interpretation of findings • results and impact of a HAZAN study • hazardous substances legislation • the process of hazard identification, risk assessment and control

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REQUIRED SKILLS AND KNOWLEDGE
• sources of hazard information (such as Material Safety Data Sheets) • safe disposal methods of materials and equipment • decontamination processes.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant/pipeline and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Simulation may be required to allow for assessment of parts of this unit. It is possible that a simulation will be required to ensure that the technician is competent before taking a significant role in a decommissioning activity. Decommissioning is an infrequent activity and so it may not be practical or equitable to wait for an actual decommissioning to occur to use this as the basis for assessment. Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/ scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster. Consistent performance should be demonstrated. In particular look to see that: • potential problems are recognised • the range of possible causes can be identified and analysed and the most likely cause determined • appropriate, timely action is taken • obvious problems in related plant areas are recognised and an

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EVIDENCE GUIDE	
	appropriate contribution made to their solution These aspects may be best assessed using a range of scenarios/case studies/what ifs as the stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.
Context of and specific resources for assessment	Assessment will require access to a plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required, as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units. In a major hazard facility, it may be appropriate to assess this unit concurrently with relevant OHS units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This competency unit includes the functions of : • liaison with manufacturers, engineering personnel, designers, maintenance personnel • participation in hazard and operability studies (HAZOP) and hazard

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RANGE STATEMENT	

	analysis studies (HAZAN)
	• removal of plant and equipment from service, which may include:
	  • 'mothballing'
	  • storage
	  • disassembly
	  • demolition
	• decontamination of equipment
	• disposal of equipment and waste.
	This competency unit includes the understanding and application of:
	• OHS regulations especially those related to plant
	• codes of practice
	• disposal procedures and regulations.
	All operations are performed in accordance with standard operating procedures.

Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.
Procedures	Procedures may be written, verbal, computer-based or in some other form. They include: • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Responsible Care) and government regulations.

Unit Sector(s)

Unit sector	Support/generic

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Competency field

Competency field	

Co-requisite units

Co-requisite units	

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PMASUP445A Participate in HAZOP studies

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the principles and application for technicians in undertaking hazard and operability studies. It is a systematic method for examining complex facilities or processes to identify actual or potentially hazardous procedures and operations so that they may be eliminated or mitigated. HAZOP studies are performed by a multi disciplinary team that identifies the potential hazards and operating issues with the design, construction and commissioning of equipment and plant. This unit may also apply to other personnel with extensive plant knowledge who are involved in the study as team members.

Application of the Unit

Application of the unit	In a typical scenario an experienced operations technician would be a participant in a multi disciplinary team consisting of operators, engineers, safety and other personnel to review a change in plant, process or equipment to see if the change can cause unforeseen hazards or introduce unexpected operability problems and that the change meets the standards. The operations technician would: • review pipe and instrumentation diagrams • identify possible hazards or operability issues • contribute to the safe and productive operation of the plant • recommend amendments to improve safety and operability of the proposed change • review and amend procedures in relation to the change The operations technician would be an experienced operator of the plant under review and part of a HAZOP study team during all phases of the study, including at the initial concept stage, when the pipe and instrumental diagrams (PID) are available, during construction, installation and commissioning and during operation reviewing and amending procedures. He/she would be expected to be capable of demonstrating competence in all parts of this unit. He/she would be actively participating in all phases of the

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	study, liaising and cooperating with other members of the team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*PMAOPS280B*	*Interpret process plant schematics*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify the principles of a HAZOP study	1.1. Explain the purpose of a HAZOP 1.2. Describe the key steps in undertaking a HAZOP study 1.3. Identify the tools used in a HAZOP study 1.4. Describe how key words assist in identifying problems 1.5. Explain how HAZOP studies are applied in the workplace
2. Participate in a HAZOP study	2.1. Identify the purpose and operation of the new/modified equipment/process

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ELEMENT	PERFORMANCE CRITERIA
	2.2. Explain the normal operating conditions, method of operation and associated equipment and componentry of proposed change 2.3. Review relevant information to assist in the identification of possible problems 2.4. Process available information to identify potential hazards or operability issues 2.5. Identify potential hazards or operability issues and possible consequences utilising key words 2.6. Assess the risks arising from identified potential hazards or operability issues 2.7. Identify items needing further action 2.8. Review relevant operating and safety procedures 2.9. Recommend possible solutions to minimise risk of proposed change.
3. Complete delegated actions within scope of responsibility.	3.1. Perform delegated actions within area of responsibility 3.2. Follow initiated items through until final resolution has occurred 3.3. Identify problems needing further action 3.4. Determine possible fault causes within area of responsibility 3.5. Report outcomes to designated person.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
This competency includes the following skills: • analysis • communication • instrument failure/malfunction • electrical failure/malfunction • mechanical failure/malfunction • equipment design deficiencies

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REQUIRED SKILLS AND KNOWLEDGE
• product parameters (temperature, flows, pressure and levels) • process control system malfunction • power/utility failures. • An ability to operate the plant under review is considered to be an essential element of this unit of competency.
Required knowledge
The knowledge referred to in the evidence guide for this unit includes: • the architecture and location of the process/production equipment • specific plant process operations • interactions between plant items/processes • product specifications and tolerances • systems operating parameters • system integrity limits • process control philosophies and strategies • emergency shutdown procedures • process specific physics, chemistry and mathematics • basic science of upstream and downstream processes • impact of external factors (eg variations in weather, feed) • process drawings (eg P&ID, PFD, cause and effect) • basis of control for the plant/s • instrumentation and control systems, components and loops as they relate to the modification under review • impacts of changing process/production equipment settings and the limits within which changes can be made • organisation procedures • OHS, hazardous substances and environmental requirements • thorough knowledge of enterprise standard operating procedures, plant processes and equipment for area under review

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

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EVIDENCE GUIDE	
Overview of assessment	The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. Simulation may be required to allow for timely assessment of parts of this unit of competency (eg elements 1-2). Simulation should be based on an actual HAZOP study relevant to the plant and may include the use of case studies/scenarios and role plays. This unit of competency requires an application of the knowledge contained in the use of the process control system and its integral equipment, to the level needed to maintain control and recognise and resolve problems. This can be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate responses. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster. Consistent performance should be demonstrated. In particular look to see that: • potential problems are recognised • the range of possible causes can be identified and analysed and the most likely cause determined • key words are utilised in the identification of potential hazards or operability issues • possible consequences are identified and explained • risks are assessed from identified potential hazards or operability issues • appropriate contribution is made to the identification of potential hazards and operability issues and risk assessment.

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EVIDENCE GUIDE	
	These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations, which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.
Context of and specific resources for assessment	Assessment will require access to HAZOP tools and relevant plant documentation or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork, communication and leadership units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicized wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards AS61882, the latest version must be used.
Context	This unit of competency includes all relevant information and plant and equipment that might be required for the HAZOP study. This may

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RANGE STATEMENT	
	include (select relevant items): • provisional layouts • material safety data sheets • process drawings (eg P&ID, PFD, cause and effect) • plant model • equipment arrangement drawings • provisional operating instructions/procedures • plant operating procedures • logic diagrams • equipment reference manuals • hazardous area layouts • start up and shut down emergency procedures • access to plant and equipment. Typical HAZOP study for your plant may include: • purpose of new equipment/plant • how the design will cope with abnormal conditions • identification of potential hazards and operating issues.
Designated action	Designated action may include: review of plant operating procedures undertaking additional tasks from action list HAZOP report attendance at HAZOP review meetings recording results from additional tasks.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Support/generic

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMASUP520B Review procedures to minimise environmental impact of process

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the minimisation of waste and environmental threat by a plant and/or a process. It covers all resources used and products made.

Application of the Unit

Application of the unit	

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used,

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a unit of competency.	further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Establish procedures for environmental management.	1.1. Establish workplace procedures of proactive environmental management which include resource conservation, pollution and waste minimisation 1.2. Determine primary source of respective aspects 1.3. Describe the negative impact of these aspects on the environment and the society if they are mismanaged 1.4. Prioritise management options according to the greatest benefit to environment and the society 1.5. Develop management procedures 1.6. Complete required documentation of implement change.
2. Review procedures for environmental management.	2.1. Review the procedures on a regular basis by consulting various work groups for feedback. 2.2. Incorporate relevant feedback into the revised procedures in consultation with the relevant personnel 2.3. Inform relevant work groups of any changes and implement changes in the procedures.
3. Implement and review an environmental management training program.	3.1. Understand the workplace environmental management training program 3.2. Review the program on a regular basis by consulting various work groups for feedback 3.3. Incorporate relevant feedback into the revised program in consultation with the relevant personnel 3.4. Inform relevant work groups of any changes and implement changes in the training program.
4. Implement and review environmental management recording system.	4.1. Understand the workplace environmental management recording system. 4.2. Review the system on a regular basis by consulting various work groups for feedback. 4.3. Incorporate relevant feedback into the revised system in consultation with the relevant personnel 4.4. Inform relevant work groups of any changes and

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ELEMENT	PERFORMANCE CRITERIA
	implement changes in the management of environmental records.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
• completing plant records • communication • problem solving.
Required knowledge

Knowledge and understanding of the control of environmental incident process and the importance of critical parameters enough to establish and review environmental management procedures within an organisation.
Competence includes the ability to apply and explain:
• nature and severity of potential environmental hazards caused by the plant/process
• sensitivity of local environment to these environmental threats
• pathways of entry to the environment from the plant
• regulatory requirements such as:
• environment protection regulations
  • OHS
  • HAZCHEM
  • duty of care
  • dangerous goods
• external licensing requirements such as:
  • EPA
  • water authorities
  • local councils
  • enterprise procedures and practices.

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to apply plant and process knowledge to identify and analyse environmental hazards, and establish and review procedures for environmental management. Consistent performance should be demonstrated. In particular look to see that: • a holistic 'clean production' approach to waste minimisation is taken • potential effects on the environment are understood • terms initiated are followed through until final resolution has occurred • the process/plant is understood and proposals are capable of implementation • training needs are addressed • records are kept.

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EVIDENCE GUIDE	
	These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and extreme situations that may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities (eg HAZOP) and similar sources.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork units, communication units and units relevant to the process equipment. In a major hazard facility, it may be appropriate to assess this unit concurrently with relevant OHS units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

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RANGE STATEMENT	

Context	This competency covers process manufacturing plants which may involve workplace hazards such as:
	• chemicals and hazardous materials
	• gases and liquids under pressure
	• materials handling.
	This competency includes:
	• legislation, codes and national standards relevant to the workplace which may include:
	  • award and enterprise agreements and relevant industrial instruments
	  • relevant legislation from all levels of government that effects business operation, especially in regard to OHS, environmental issues and industrial relations
	  • relevant industry codes of practice
	• awareness of the environment and the effects on the environment of the organisation's:
	  • liquid waste
	  • solid waste
	  • gas/fume/vapour/smoke emissions, including fugitive emissions
	  • hazardous materials
	  • excessive energy and water use
	  • excessive noise
	and the workplace practices that can be used to minimise or prevent these effects.

Information	Information may include: • organisational policies and procedures • relevant environmental legislation/regulation requirements • licence conditions • environmental treaties, conventions and national policies and strategies • National Pollutant Inventory • State of the Environment reports • voluntary environmental agreements entered into with external organisations/authorities • continuous improvement policies and processes for the organisation.
Work group	Work group may include: • formal or unstructured groups

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RANGE STATEMENT	
	• two or more people.
Proactive environmental management	Proactive environmental management may include: • resource conservation and efficiency • minimisation of waste • recycling • reduction in use of non-renewable resources • maximisation of product yield from raw materials • reduction in volume of pollutants made • reduction in concentration/intensity of pollutants made • reduction in emissions.
Approaches to proactive environmental management	Some approaches to proactive environmental management may include: • preventing and minimising the production of pollution, eg discharges to air, land and water, hazardous waste • improving housekeeping, eg using a broom instead of a hose, using old rags for cleaning instead of toxic cleaners or water • substituting materials, eg replacing toxic solvent based coatings with water based ones • changing processes, eg mechanical cleaning, re-design of products/ procedures so that materials are used more efficiently.
Environmental management policies	Environmental management policies must be appropriate to the scope and scale of the enterprise and may include: • environmental load reduction and waste minimisation • tenders for the provision of goods and services that specify environmentally preferred selection criteria • protection of land and habitat • environmentally sustainable work practices.
Typical functions	Typical functions may include: • examining plant records • examining operating procedures and practices • liaising with a range of internal people
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

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Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMASUP540B Analyse equipment performance

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the analysis of the performance, and performance verification, of existing equipment.

Application of the Unit

Application of the unit	In a typical scenario an experienced technician will set up and operate performance verification trials and then analyse the results to determine actual compared to theoretical performance of equipment and equipment components. It includes: • calculating the theoretical performance of an item of equipment • gathering data to determine the actual performance of the item of equipment • calculation of actual versus theoretical performance • making recommendations as to the appropriate action to be taken based on the performance verification results. This competency is typically performed by a senior technician who will take the lead in the data gathering phase and then analyses the data.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine theoretical performance.	1.1. Identify item of plant or equipment to be analysed 1.2. Locate and interpret design specification 1.3. Identify process materials being processes/to be processed during verification trial 1.4. Determine process material properties under process conditions 1.5. Calculate theoretical performance of component(s) with that material under those conditions.
2. Conduct trial.	2.1. Design verification trial to be compatible with theoretical analysis 2.2. Determine measurements needed from trial to yield required data 2.3. Select equipment suitable to give required measurements 2.4. Arrange for verification trial with relevant process personnel 2.5. Set up required measurement equipment 2.6. Supervise trial and ensure trial conditions are appropriate 2.7. Collect trial data for analysis.
3. Verify performance of plant/equipment.	3.1. Compare theoretical with actual performance 3.2. Determine significance of variation between

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ELEMENT	PERFORMANCE CRITERIA
	theoretical and actual performance 3.3. Investigate any suspicious results and take appropriate action.
4. Recommend required action.	4.1. Determine appropriate action to bring performance to desired level 4.2. Initiate the corrective action in accordance with company procedures. 4.3. Determine measures to increase equipment productivity 4.4. Re-check performance after corrective action is implemented.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
Competence, for the practical completion of the job, includes the ability to: • calculate equipment and component performance from the design specification • determine equipment and design performance from practical trials • determine the 'limiting component' in the performance of an item of equipment or a process • determine possible performance of an item of equipment/process if practical improvements were made to the 'limiting item'.
Required knowledge
Knowledge and understanding of the materials, equipment and process sufficient to predict their interactions and their impacts on performance. Knowledge of the enterprise procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job. Knowledge of: • methods of identifying and calculating theoretical performance • ways of trialling, trial design and implementation • methods of data analysis to determine trial outcomes • methods of interpreting information deduced from trial data.

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Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Assessment might typically be by an analysis project. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to carry out the analysis without undue disruption to the process. Consistent performance should be demonstrated. In particular look to see that: • trial design is appropriate • data taken during trial matches that required for the analysis • the analysis is carried out in a structured manner • recommended changes can be justified based on the comparison of trial and theoretical data.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of projects will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.

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EVIDENCE GUIDE	
	In a major hazard facility, it may be appropriate to assess this unit concurrently with relevant OHS units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This competency unit includes the analysis of plant, equipment and equipment components. This competency applies to all work environments and sectors within the chemical, hydrocarbons and oil refining industry, but does require both a theoretical/ mathematical and a practical analysis of the process. The competency does not require a knowledge of industry sectors and materials other than that in which the technician works. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally. Typical problems include: • worn equipment/components • validation of new equipment/components to design specification • performance analysis in order to upgrade process performance.
Health, safety and environment (HSE)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

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Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMBFIN201C Finish products and components

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers a range of processes subsequent to the actual making of the product which have been grouped together under the heading of 'finishing'. It applies to the finishing of products for customer use, and the finishing of components for use by a subsequent process or organisation which may then further process or assemble these components into a finished product, and similar activities. It applies across all sectors of the industry.

This competency is typically performed by personnel working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to production support or moulding operators who are required to apply knowledge of product quality standards, and product defect classification, and operate value adding secondary processing units such as trimming and assembly, and, other personnel who perform initial finishing processes to products after the production process. The key factors are the removal of waste/excess material from the product and preparing the product for either further processing or customer delivery. This includes:

- checking job sheets for work to be done
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety (OHS) legislative responsibilities
- inspecting the product for routine and non-routine finishing processes
- discussing finishing requirements with other workers
- applying finishing process to product
- inspecting finished product and sorting in accordance with job specifications
- identifying and taking action on routine product imperfections
- discussing non-routine product imperfections with designated person.
-

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Establish requirements for the finishing process.	1.1 Identify work requirements from procedures 1.2 Assemble equipment and consumables for the finishing process. 1.3 Consult workplace procedures and materials safety data sheets to confirm the work planning process. 1.4 Ensure safety equipment is available and in sound condition. 1.5 Remove products from equipment if required using enterprise standard handling methods.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	1.6 Recognise end-of-product run.
2. Check quality of product.	2.1 Inspect product to identify routine and non-routine finishing requirements. 2.2 Identify significant finning, flash or other quality problems and report to appropriate person for investigation of mould/ die closure/alignment. 2.3 Check with appropriate personnel regarding modifications to finishing process. 2.4 Identify and process non-conforming products in accordance with workplace procedures.
3. Undertake the finishing operation.	3.1 Trim product as required. 3.2 Apply procedures to other finishing processes. 3.3 Undertake other secondary process operations required. 3.4 Follow waste and recycling procedures. 3.5 Inspect finished product and compare to specifications for suitability for further processing or for customer delivery. 3.6 Assemble finished products and sort in accordance with procedures. 3.7 Pack as required. 3.8 Record product data as required. 3.9 Clean up work area and perform housekeeping.
4. Identify and rectify routine product imperfections.	4.1 Identify the range of routine imperfections that can occur during the production process. 4.2 Determine and rectify routine product imperfections in accordance with procedures. 4.3 Ensure appropriate records and log books are maintained to meet procedures/work instructions. 4.4 Identify non-routine product imperfections and report to designated person.

Required Skills and Knowledge

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This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification product imperfections and techniques necessary to finish products for customer use.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability to:

- apply and/or explain, selection and application of appropriate processes, and selection of appropriate tools for the process
- locate, interpret and apply relevant information to the finishing process
- identify and safely handle products
- select and apply appropriate finishing process
- meet waste and recycling requirements

It is also necessary to demonstrate the ability to distinguish between causes of faults such as:

- product defects, eg flashing, distortions, stress marks, sinks, voids, short shots, poor colour distribution, moisture marks, gassing, burn marks
- inappropriateselection and use of finishing equipment/processes
- poor surface finish
- fining or shuts
- variations in section thickness.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg counting numbers of products and percentage of rejects.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

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It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to

- recognise potential situations requiring action implement appropriate action
- understand procedures.

Consistent performance should be demonstrated. For example, look to see that:

- production standards are met consistently
- the importance of critical material properties and quantities to the finishing process is recognised
- safety procedures are followed.

Assessment method and context

Assessment will occur finishing industrial products and components and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- on a processing plant allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

Method of assessment

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

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The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context:

This competency applies to personnel working either independently or as part of a work team.

Procedures:

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- electric and/or air powered routers, saws, drills, drivers and sanders knives, files and scrapers
- hand carts and trolleys
- hoists/jigs/lifting equipment not requiring any special permits or licences
- knives and knife sharpeners band saws, hand saws
- personal safety equipment such as gloves and goggles or face shields handling aids such as jigs and gantries.

Hazards:

Typical hazards include:

- manual handling hazards
- knife hazards
- humidity, air temperature, radiant heat
- stationary and moving machinery, parts and components.

Problems:

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- movement of jigs or fixtures
- power failures
- non-supply of materials
- broken cords
- damaged or inoperable equipment
- variations in materials
- temperature of product to be finished
- movement of inserts, reinforcements or fittings size of some products
- inappropriate selection and use of finishing equipment/processes

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- poor surface finish
- fining or shuts
- variations in section thickness.

Variables:

Key variables to be monitored include:

- finishing production rates
- degrees of finish
- preservation of identifying marks and trademarks
- ability to deal with material variations
- correct application of protective coatings
- waste collection and disposal
- conformance with frequency and quality of organisational reporting requirements.
-

Unit Sector(s)

Not applicable.

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PMBFIN205C Hand decorate products

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the hand decorating of products as part of the finishing process of products for customer use. It applies to all sectors of the industry.

This competency is typically performed by all operators working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to operators who perform hand decorating techniques to products as part of the finishing process. The key factors are identifying appropriate materials, correct positioning, alignment and cleanliness.

It includes:

- checking job sheets for work to be done
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety (OHS) legislative responsibilities
- inspecting the product for routine and non-routine finishing processes discussing finishing requirements with other workers
- product surface cleanliness
- applying decorating materials to product
- inspecting finished product and sorting in accordance with job specifications
- identifying and rectifying routine product imperfections
- discussing non-routine product imperfections with designated person.
-

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites:

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Establish requirements for the finishing process.	1.1 Interpret customer order or product specifications. 1.2 Check availability of materials and equipment. 1.3 Identify and inspect products to be decorated for suitability of process. 1.4 Report unsuitable products to designated person. 1.5 Assemble materials, tools and facilities and check for suitability. 1.6 Locate manufacturer information and safety advice on products and use to plan work. 1.7 Identify required work sequences, times, work process stages. 1.8 Identify required work sequences, times, work process stages, engineering controls and personal

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	protective equipment, and plan order of work.
2. Prepare surfaces.	2.1 Inspect product surfaces for contamination or damage. 2.2 Identify and eliminate sources of contamination. 2.3 Prepare surfaces in accordance with manufacturer instructions and workplace requirements.
3. Hand decorate products.	3.1 Identify required decorations to meet job order requirements. 3.2 Ensure decorations are fit for use and return those damaged or unusable. 3.3 Apply decorations in the appropriate locations 3.4 Inspect finished product and compare specifications for suitability for further processing or for customer delivery 3.5 Assemble finished products and sort in accordance with procedures 3.6 Clean up work area and perform housekeeping.
4. Identify and rectify routine hand decorating problems.	4.1 Identify the range of routine problems that can occur during the hand decorating process 4.2 Determine and rectify routine hand decorating imperfections in accordance with procedures 4.3 Identify faults in equipment, tag unserviceable equipment and report to designated person 4.4 Ensure appropriate records and logbooks are maintained to meet procedures.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise problems that can occur during the hand decorating process.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

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Competence includes the ability to:

- locate, interpret and apply relevant information to finishing process
- identify and safely handle products
- select and apply appropriate finishing process
- apply and/or explain: waste and recycling requirements; non-adherence of transfers, decals or stamps.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg counting numbers of products and percentage of rejects.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- understand the importance of critical material properties and quantities
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. For example, look to see that:

- production standards are met consistently
- decorations are applied consistently and at an appropriate rate.

Assessment method and context

Assessment will occur decorating industrial products and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

  - on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing for the generation of evidence of the ability to respond to problems

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- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context:

This competency applies to all operators working either independently or as part of a work team.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include:

- original manufacturer instructions and guidelines for the use of the decorating equipment or product
- relevant procedures relating to safe working practices prescribed for the equipment or product
- local OHS legislation and/or regulations

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- site-specific instructions based on production requirements.

Tools and equipment

This competency includes use of equipment and tools such as:

- hand carts and trolleys
- hoists, jigs and gantries
- lifting equipment not requiring any special permits or licences
- adhesive application equipment
- relevant personal protective equipment.

Hazards:

Typical hazards include:

- manual handling hazards
- solvents and cleaning agents
- humidity, air temperature, radiant heat
- stationary and moving machinery, parts and components.

Problems:

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process and product problems may include:

- non-supply of product
- incorrect selection or supply of materials
- misalignment of decals, transfers or other decorative materials.
- variations in materials
- temperature of product to be finished
- contamination of surfaces
- decals/transfers or stamps not within specification or not fit for use.

Variables:

Key variables to be monitored include:

- positioning or location of decorative material
- consistency of application
- differing atmospheric conditions
- selection of appropriate decorative materials
-

Unit Sector(s)

Not applicable.

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PMBHAN103C Shift materials safely by hand

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the shifting of materials by hand in a safe manner. It applies to all sectors of the industry.

This competency is typically performed by all operators working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to operators who move packages, loose goods, materials and products by lifting, pushing and pulling without injury to themselves or damage to the materials being moved. The key factors are planning and executing the move in a safe and efficient manner. It includes:

- identifying the type of material to be moved
- identifying the route to be used
- identifying and using the most appropriate piece of equipment
- following OHS State regulations to complete the operation.

This competency unit includes the use of manual handling aids such as handcarts. It does NOT include the use of powered equipment/aids or licensed load shifting equipment.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has no prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Plan operations.	1.1 Correctly identify type and quantity of produce or material to be moved. 1.2 Identify the safest and most efficient and appropriate movement route.
2. Manually transfer products or materials.	2.1 Manually shift products or materials to and from production processes according to procedures and OHS State regulations. 2.2 Manually load specified products or materials at specific points during the manufacturing process, according to procedures and OHS State regulations.
3. Store, stack and/or relocate products or materials.	3.1 Manually stack products or materials according to procedures and OHS State regulations. 3.2 Manually store products or materials in correct locations. 3.3 Document and/or report material movements as required.

Required Skills and Knowledge

- This describes the essential skills and knowledge and their level required for this unit.

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- Knowledge is required of good manual handling practice including organisation procedures and relevant State OHS regulations for manual handling and lift techniques sufficient to recognise potential problems and to take the appropriate action.
- Knowledge is required of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Language, **literacy and numeracy requirements**

- This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.
- Writing is required to the level of completing workplace forms.
- Basic numeracy is required (eg to determine that two 25 kg bags are needed to make up a requirement for 50 kg).
-

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

- It is essential that manual handling principles are applied and that the importance of safe manual handling techniques is known. Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate action.
- It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to apply and/or explain:
- correct OHS procedures
- appropriate manual handling and lifting/moving techniques
- appropriate lifting/moving equipment
- relevant inventory systems.
- Competence includes the ability to be able to distinguish between jobs which:
- may be easily and safely done by a single person
- will require assistance from other people
- require manual handling equipment
- need mechanical lifting aids.
- Consistent performance should be demonstrated. For example, look to see that standard operating procedures and all safety procedures are adhered to

Assessment method and context

- A holistic approach should be taken to the assessment.
- Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

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- Competence in this unit may be assessed:
  - on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.
- In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.
- Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

- This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.
- Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
-

Range Statement

RANGE STATEMENT

- The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.
- Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

- This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant ancillary equipment.
- The processes covered by this unit include, but are not limited to:
- movement of materials
- stacking/storing/relocating of materials.
- Loads to be shifted may be, but are not limited to:
- irregularly shaped

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- packaged/unpackaged
- labelled/unlabelled.

Procedures

- All operations are performed in accordance with procedures.
- Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.
- All operations are performed in accordance with standard procedures and work instructions.

Tools and equipment

- This competency includes tools and equipment such as:
- hand carts
- self-propelled trolleys
- wheelbarrows
- block and tackle
- relevant personal protective equipment.

Hazards

- Typical hazards include:
- spills
- dusts/vapours
- hazardous materials
- manual handling hazards

Problems

- Typical problems include:
- load too heavy or large for safe, easy moving
- load in awkward position for safe, easy moving
- clash of work priorities
- correct equipment not available.
- Appropriate action for problems outside of area of responsibility may be reporting to an appropriate person.
- Appropriate action for solving problems within area of responsibility includes asking questions and seeking assistance from appropriate persons/sources.
-

Unit Sector(s)

Not applicable.

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PMBPREP205C Assemble materials and equipment for production

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the interpretation of product specifications, selection of required materials and equipment, organising delivery and confirmation of material/equipment delivery to the production area in preparation for production.

This competency is typically performed by operators working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to operators who collect and prepare materials for the production process. The key factors are the delivery of the right material to the right place at the right time and ensuring there is no contamination of the materials.

It includes:

- checking job sheets for work requirements
- discussing work progress with other workers
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with OHS legislative responsibilities
- collecting a range of materials and assembling them close to the start of the process and in the same sequence as the jobs are to be done
- moving the correct number of bags, drums, etc into the assembly area
- checking materials to ensure no contamination
- moving required materials into the right place by the right time.
-

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify required materials and equipment.	1.1 Interpret product specifications. 1.2 Identify required materials, including additives. 1.3 Identify trade names for required product. 1.4 Determine quantity of materials required for product. 1.5 Identify required equipment including handling, control and material preparation equipment.
2. Locate materials and equipment.	2.1 Locate required materials, equipment and machinery. 2.2 Mark items off on check list as required. 2.3 Identify non-conformances and report as required. 2.4 Identify and prepare appropriate holding area.
3. Assemble materials and equipment.	3.1 Use good manual handling practices. 3.2 Follow required procedures, particularly OHS

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	procedures, codes and practices. 3.3 Collect and organise materials in a manner that ensures storage compatibility. 3.4 Visually check materials according to enterprise requirements. 3.5 Collect holding sample according to enterprise requirements. 3.6 Record details of specification and sample as required.
4. Organise internal workplace delivery of materials/ equipment as required.	4.1 Organise placement of material to required locations using enterprise procedures. 4.2 Notify and confirm delivery as per enterprise requirements/procedures. 4.3 Follow workplace procedures as required by enterprise.
5. Store materials for production as required.	5.1 Identify storage requirements. 5.2 Check holding area conditions meet material requirements. 5.3 Store materials as required for production and to meet health and safety needs. 5.4 Complete required workplace documentation/ records.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, processes and material faults.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Knowledge of and skills in the assembling of materials and equipment sufficient for consistent production of quality products including:

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- basic units of measurements such as additions, subtractions, divisions, fractions, percentages
- dial, scale and digital read-outs
- materials safety data sheets
- a limited knowledge and application of polymer materials
- definitions of thermoplastics and thermosetting materials
- trade names of common plastic materials
- formulas of common plastics
- end use examples of plastics, by type and common family names
- hazard and safety precautions for common polymer family characteristics; dangerous goods Act, regulations, as relevant
- Hazchem requirements as relevant to the job
- safe working practices in handling polymers
- PPE equipment requirements
- impact of incorrect or faulty materials
- production workflow sequences and materials demand
- focus of operation of work systems and equipment
- correct selection and use of equipment, materials, processes and procedures;
- hazards of the materials and process and appropriate hazard control procedures.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, e.g. to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

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- get the right materials to the right place, in the right quantity and at the right time
- ensuring there is no contamination
- placing (storing) them at the correct location in a safe manner.

Consistent performance should be demonstrated. For example, look to see that production standards are met consistently.

Assessment method and context

Assessment will occur on using industrial materials and equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

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Context

This competency applies to operators working either independently or as part of a work team.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- hand carts and trolleys
- knives and other bag opening equipment
- hoists/lifting equipment not requiring any special permits or licences
- bung spanners and similar
- basic hand tools required for opening of material packaging
- relevant personal protective equipment.

Hazards

Typical hazards include:

- spills dusts/vapours
- slip and fall, particularly due to spilt granules
- temperature
- hazardous substances
- moving equipment
- manual handling hazards
- knife hazards.

Problems

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'. Typical process and product problems may include:

- equipment malfunction
- non-supply or incorrect supply of materials
- misreading labels or instructions
- variations in materials
- contamination of materials
- incorrect quantity of materials/additives.

Variables

Key variables to be monitored include:

- nature and type of materials
- nature and type of equipment
- power medium for equipment
- location of equipment

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- material mass
- material handling equipment.
-

Unit Sector(s)

Not applicable.

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PMBPREP206C Prepare materials to formulae

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers preparing materials to formulae for production or product finishing.

Application of the Unit

Application of this unit

This competency applies to operators who assemble materials to formulae for production or production finishing. The key factors are identifying handling requirements for materials, preparing for the combination of ingredients and collecting and assembling ingredients. This competency is typically performed by operators working either independently or as part of a work team.

It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- collecting a range of materials and assembling them close to the start of the process and in the same sequence as the jobs are to be done checking materials to ensure no contamination
- combining materials to a formulae
- moving required materials into the right place by the right time.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

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This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify requirements to handle materials.	1.1 Read and interpret specifications for materials and identify materials. 1.2 Identify units of measurement and matching measuring equipment. 1.3 Know the tolerances of measuring equipment and relate them to the impact of over/under measurement of ingredients on production process and quality. 1.4 Follow procedures to identify and control hazards. 1.5 Read workplace procedures and use them to plan work sequence.
2. Prepare for assembly of ingredients.	2.1 Calibrate or zero equipment for measurement and/or identify appropriate measurement scales. 2.2 Set up and fit required personal protection equipment and engineering controls.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	2.3 Assemble equipment for dealing with emergencies. 2.4 Check work area for cleanliness. 2.5 Identify sources of potential contamination and take steps to minimise/eliminate contamination risk.
3. Assemble ingredients.	3.1 Collect ingredients. 3.2 Weigh/measure ingredients according to procedure. 3.3 Follow appropriate workplace approved sequence for combination of materials. 3.4 Follow standard operating procedures and observe appropriate safety measures when conducting work. 3.5 Check for correctness of colour to standard. 3.6 Take action specified in procedures if materials/assembled ingredients do not appear to meet requirements. 3.7 Complete workplace records. 3.8 Store unused ingredients, and clean and store equipment.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability to:

- use measuring systems, scales and calculating devices
- observe storage and mixing requirements for materials to be mixed
- assess production workflow in relation to materials supply requirements

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- recognise the focus of operation of work systems and equipment
- identify and correctly use equipment, processes and procedures
- plan own work, including predicting consequences and identifying improvements.

Language, literacy and numeracy requirements

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is also required, e.g. to interpret specifications and measure accurately and perform simple addition and subtraction.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- use measuring scales and equipment
- locate, use, interpret and apply relevant formulae and information
- maintain workplace records for materials used and mixes produced
- identify and safely handle products and materials applying safety precautions appropriate to the task, including safe storage of materials.

Consistent performance should be demonstrated. For example, look to see that:

- critical material properties and quantities are known
- potential situations requiring action result in implementing appropriate action.

Assessment method and context

Assessment will occur using industrial materials and formulae and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- on a processing plant, allowing for operation under all normal and a range of abnormal conditions

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- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment:

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to operators working either independently or as part of a work team.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- measurement equipment

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- knives and other bag opening equipment
- hoists/lifting equipment not requiring any special permits or licences basic hand tools required for opening of material packaging
- relevant personal protective equipment.

Hazards

Typical hazards include:

- spills dusts/vapours
- hazardous materials
- manual handling hazards
- knife hazards.

Problems

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'. Typical process and product problems may include:

- inappropriate selection of raw materials
- contamination of raw materials
- incorrect formulae being selected
- combining inappropriate materials
- variations in materials
- contamination of materials.

Variables

Key variables to be monitored include

- mixtures and or proportions of materials to be used
- mixing techniques
- order of ingredient addition to the mixture
- atmospheric conditions
- cleanliness of the mixing area
- cleanliness of utensils.
-

Unit Sector(s)

Not applicable.

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PMBPREP301C Set up and prepare for production

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the set-up and preparation of materials and equipment for production in the plastics, rubber and cablemaking sectors. It applies to batch, one-off and non-standard production lots.

Application of the Unit

Application of this unit

This competency applies to advanced operators who set up and prepare for the production process. The key factors are checking equipment and materials for conformity to specification and working to a process plan. This competency is typically performed by experienced operators working either independently or as part of a work team.

It includes:

- selecting and checking equipment and materials against specifications
- identifying requirements for special tooling and set-up
- drafting a work process plan, including objectives and timeframe
- preparing tools, equipment and materials
- setting up, checking and adjusting the production process
- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- correcting materials, equipment or process variations and making appropriate adjustments
- completing logs and reports.
-

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

The required outcomes described in this unit contain applicable Employability Skills. The Employability Skills Summary of the qualification(s) in which this unit is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Select equipment and materials.	1.1 Identify equipment and materials from job specification. 1.2 Check equipment and materials for conformity to specification. 1.3 Note any variances in materials (within materials supplier specifications) which may require variation in production process settings. 1.4 Identify requirements for special tooling and set up. 1.5 Note conformity deficiencies and report to appropriate personnel. 1.6 Identify production objectives and timelines.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	1.7 Clarify product specifications. 1.8 Draft work process plan, noting key quality characteristics, check points and activities where other personnel will be involved.
2. Prepare tools, equipment and materials.	2.1 Locate tools and equipment within workplace ensuring safety and operational checks are performed and equipment is appropriate for purpose. 2.2 Obtain materials specifications and confirm materials are at site for the commencement of production in accordance with established procedures. 2.3 Check materials are prepared to achieve product specification.
3. Set up and check production process.	3.1 Follow procedures for setup in accordance with workplace procedures, customer requirements and specifications. 3.2 Set machine control parameters in accordance with specifications. 3.3 Check work process plan and set up for conformity with identified workplace procedures and customer requirements. 3.4 Make any required adjustments to own work plan. 3.5 Obtain appropriate clearances for production to commence. 3.6 Check equipment for function and make provisional control settings. 3.7 Check performance of equipment and materials. 3.8 Adjust process settings and materials to ensure production outcomes are within quality specifications. 3.9 Make and store records of required adjustments within specification ranges in accordance with workplace procedures.

Required Skills and Knowledge

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This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of organization procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Knowledge as a basis for solving processing and material problems including:

- products, materials and material characteristics
- behaviour of materials in relation to heat, pressure and time; quality requirements at each production stage
- function and operating principles of equipment, machine components and ancillary equipment
- impact of machine operating parameters on product quality and production output
- nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which may effect machine operation and product development
- assessing operational capabilities of equipment
- predict materials behaviour
- adjust machine parameters
- assess production workflow in relation to focus of operation of work systems and equipment
- identify and correctly use equipment, processes and procedures
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check equipment for correct set-up to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevantsafety information and apply safety precautions appropriate to the task.

Language, **literacy and numeracy requirements**

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This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is also required, eg to determine quantities required for production run/batch.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- select, set up and adjust equipment
- arrange materials supply
- inspect results of checks for equipment and materials performance
- locate, interpret and apply relevant information
- maintain workplace records
- identify and handle products and materials safely, applying safety precautions appropriate to the task
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. For example, look to see that:

- set-up conforms to organisation requirements
- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly

Assessment method and context

Assessment will occur using industrial equipment and materials and will be undertaken in a work-like environment.

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Competence in this unit may be assessed:

- on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to experienced operators working either independently or as part of a work team.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

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This competency includes use of equipment and tools such as:

- hand carts and trolleys
- hoists/lifting equipment not requiring any special permits or licences
- relevant personal protective equipment.

Hazards

Typical hazards include:

- moving heavy equipment/materials items
- materials spills
- fumes/dusts/vapours
- hazardous materials in gaseous, liquid or solid form
- manual handling hazards

Problems

Anticipate and solve problems means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

- power or equipment failures
- temperature variations
- variations in materials
- contamination of materials
- faulty functioning of equipment.

Variables

Key variables to be monitored include:

- variations in the timing of machine cycles
- atmospheric variations
- variations in the sequence of product availability
- variations in the quality of the raw materials.
-

Unit Sector(s)

Not applicable.

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PMBPREP303C Set up equipment for continuous operation

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers setting up equipment for a continuous production run. It applies to processes which are essentially continuous in nature, and standard production processes.

Application of the Unit

Application of this unit

This competency applies to advanced operators who set up equipment for continuous operation. The key factors are production requirements and setting up equipment to match requirements. This competency is typically performed by experienced operators working either independently or as part of a work team.

It includes:

- identifying production requirements and key stages of the process
- setting up equipment and components safely, accurately and in a way that allows production to flow and workers to move safely
- explaining processes to the operator if required
- producing a one-off sample
- observing process outcomes and using them to fine tune the process
- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are re-used where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.
-

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Identify production requirements.	1.1 Read specifications and standard operating procedures for production run and equipment. 1.2 Identify materials required. 1.3 Note production control requirements for production and warm up time, pressure(s), speed(s), temperature(s) and product specifications. 1.4 Note key stages in the process for quality checks. 1.5 Identify equipment and components required. 1.6 Check assembly requirements for items of production

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	and downstream equipment or specialised componentry to ensure efficient work flow will occur.
2. Set up equipment	2.1 Check work area to ensure adequate space for the process. 2.2 Place equipment and components in required configuration. 2.3 Install guards, warning devices and cut-offs as required. 2.4 Check all connecting components and services for integrity and effectiveness. 2.5 Check dies/ moulds/jigs as required for suitability for production requirements. 2.6 Place standard operating procedures and quality procedures in appropriate work stations. 2.7 Check work area for operator ergonomic efficiency, access and egress requirements.
3. Explain process to operators when required	3.1 Explain particular requirements for machine adjustments, materials characteristics, quality specifications and key production stages to the operator. 3.2 Explain standard operating procedures and any particular OHS issues are identified. 3.3 Identify and explain appropriate contingency strategies for process faults, quality, OHS issues, materials supply or quality machine malfunctions. 3.4 Encourage operators to ask questions and clarify procedures.
4. Produce first-off production sample(s).	4.1 Start process following standard operating procedures. 4.2 Observe product quality through process and compare to standards. 4.3 Compare machine setting ranges to documented requirements. 4.4 Use observations of the process outcomes to fine tune the settings and other production variables. 4.5 Check final product for the required standards.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	4.6 Compare standard operating procedures with actual production run and note variances.
5. Fine tune the process.	5.1 Use information collected during trial to modify workplace documentation, including standard operating procedures, machine settings and process instructions. 5.2 Obtain appropriate advice and permission where variations are outside of quality or specification range. 5.3 Advise operators of variations to process and document as required.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Knowledge as a basis for solving processing and material problems including:

- products, materials and material characteristics
- quality requirements at each production stage
- function and operating principles of equipment, machine components and ancillary equipment
- impact of machine speed, temperature, pressure, time during cycles on product quality and production output
- the hierarchy of control, including engineering controls
- impact of variations in raw materials and equipment operation in relation to final product
- changes to materials at various stages of production
- waste management and importance of non-conforming materials
- identify impact of mechanical, hydraulic, pneumatic and electrical/electronic principles of the production process
- distinguish particular requirements of products, materials, equipment and production process

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- identify likely faults and remedies
- recognise focus of operation of work systems and equipment
- assess production workflow and the relationships with equipment, materials and product storage areas and workplace rosters and order systems
- identify and correctly use equipment, processes and procedures
- plan own work, including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify factors which may affect product quality or production output and appropriate remedies
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is also required, eg to determine quantities required for a run.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

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It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- identify equipment and components by name and operating principles and function, and to locate, interpret and apply relevant information
- maintain workplace records, identify and safely handle products and materials applying safety precautions appropriate to the task
- identify critical materials properties and process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. For example, look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Assessment method and context

Assessment will occur using industrial equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

  - on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to experienced operators working either independently or as part of a work team.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- hand carts and trolleys
- hoists/lifting equipment not requiring any special permits or licences
- basic hand tools required for opening of material packaging
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Hazards

Typical hazards include:

- inadequate use of guards and warning signs
- manual handling hazards
- hazardous materials
- equipment operations.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

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- variations in materials
- faulty components
- machine malfunction
- variation in product
- contamination of materials
- processing problems.

Variables

Key variables to be monitored include:

- variations in the timing of machine cycles
- variations in the sequence of product availability
- variations in the quality of the raw materials
- product integrity and general conformance to specification/sample.
-

Unit Sector(s)

Not applicable.

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PMBPREP304C Set a die

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the removal, refitting and setting of dies in preparation for production. It applies typically to the moulding areas of the industry such as injection moulding, and blow moulding.

For setting dies for extrusion, cablemaking and blown film, use *PMBPREP305B Change extrusion die and calibration set-up*. For changing moulds for rotational moulding or thermoforming, use *PMBPROD282B Assemble mould*. For quick change of dies, use *MCMT220A Apply quick changeover procedures*.

This competency is typically performed by advanced operators or operators demonstrating some relevant theoretical knowledge and using a range of well-developed skills requiring some discretion and judgement.

Application of the Unit

Application of this unit

This competency applies to advanced operators or operators who set dies in preparation for the production process. The job involves the die change and the setting of moulding conditions or program for the new die, and can include nozzle change, die tooling changing, screw cleaning and connection of ancillary equipment. The key factors are the safe, precise and efficient removal of dies and the correct installation and setting ready for production. It includes:

- planning and preparing the change including informing others
- selecting dies, tools and parts that are required for the die changeover
- removing, cleaning and storing the existing dies
- accurately attaching the replacement die according to specification
- accurately setting the machine conditions for the new die
- checking the die and process for efficient operation and making appropriate adjustments.
-

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

People being trained in this unit who do not have an appropriate production or trade background may require extra time allowance.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	**PERFORMANCE CRITERIA**
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Prepare to change dies.	1.1 Determine when changeover will be required, and plan requirements for die change. 1.2 Obtain dies and or cores and all parts and tools to match the production order. 1.3 Follow procedure for machine close-down and for informing relevant personnel. 1.4 Take last-off samples as required for die reports.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	1.5 Close down machine in accordance with procedures. 1.6 Prepare machine for changeover in accordance with procedures.
2. Change dies.	2.1 Plan removal process to ensure no damage to self, equipment or others. 2.2 Remove, clean and store die according to workplace procedures applying corrosion protection if required. 2.3 Attach replacement die ensuring that locating devices and marks are matched and securing devices are installed and tightened to specification.
3. Set dies.	3.1 Set machine conditions for new die. 3.2 Restart machine as per procedure. 3.3 Dry cycle machine and die according to enterprise procedures. 3.4 Check operation of die against product quality specifications. 3.5 Check the first off sample for compliance with required standards. 3.6 Fine tune settings and other production variables as required. 3.7 Note any equipment variances between actual production and documented set up conditions. 3.8 Complete workplace documentation and report to appropriate personnel.
4. Anticipate die setting problems.	4.1 Identify potential problems which may occur during the die changing and setting process. 4.2 Determine possible causes of these problems. 4.3 Identify most likely causes and prioritise appropriate actions. 4.4 Rectify problems using appropriate solutions within area of responsibility. 4.5 Recommend improvements in systems or procedures.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Competence in this unit includes the ability for the practical completion of the job to apply and/or explain the:

- organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards
- construction of simple dies and their components, including fixed and removable cores, inserts, ejection systems, vents
- methods of connecting dies to machines, such as bolting to platens, slots etc.
- the function of each machine setting and the appropriate ranges of settings for a given die
- equipment and process sufficient to recognise conditions which may lead to out of specification production
- impact of incorrect or faulty fitting
- correct selection and use of equipment and procedures
- hazards of the removal and fitting process and appropriate hazard control procedures
- relevant information and workplace records
- safety precautions appropriate to the task.
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

It also requires skills in the safe, precise and efficient removal of simple dies and their correct installation and the ability to plan their own work, including predicting consequences and identifying improvements.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical production orders and die set-up information.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg to monitor and set displays, gauges and dials to correct values according to set-up sheet.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

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Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability to change and set a die in a manner which will put the moulding machine back into full production of in specification product in standard time. In particular it is essential that the operator can:

- select, install and check the performance of dies and cores
- apply safety precautions appropriate to the task
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. For example, look to see that:

- standards are met consistently
- problems are appropriately resolved.

Assessment method and context

Assessment will occur on equipment using simple dies and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- by using an appropriate, industrial moulding machine requiring demonstration of die change and die setting procedures
- in a situation allowing the generation of evidence of the ability to perform die change and die setting procedures and to recognise and resolve problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

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Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the setting and removal of simple dies. It does not include advanced and complex dies

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry which use moulding dies. It includes the operation of all relevant ancillary equipment.

Die

A former used to give the required shape to the product and used under pressure. Dies are typically used in the extrusion, injection, blow moulding and general rubber sectors. Dies used which are not subject to pressure are referred to as 'moulds' in this Training Package.

Simple die

A two plate die including any ejection system operating in the mould open axis, but excluding moulds with molten material retained within the mould between cycles. Products are simple, straight drawn items. Typical features may include: force, cavity, back plates, support plates, cold runner, sprue, nozzle seat, locating ring-tab, sub, fan, diaphragm and direct gating, ejector pins and sleeves, ejector plate and stripper plate, simple drilling for mould cooling.

Advanced die

A two or three plate die with one or more product forming components which move in a direction other than the mould open axis, and which are driven by the mould rather than external actuation. Excludes moulds which retain molten material within the mould between cycles. Typical features may include: sliding blocks or cores actuated by skew pins or cams; baffled, spiral, tube, and heat pipe cooling systems; rising cores; and internally actuated unscrewing systems.

Complex die

Dies which use at least one external power and control source to actuate product forming components, which move in a direction other than the mould open axis, and require sequencing with the mould operation. Includes moulds which retain molten material within the mould between cycles. Typical features may include: hot runners; insulated runners; externally actuated sliding blocks, cores, and unscrewing systems; safety interlocks.

Requirements

Requirements for the die change may include checking the die dimensions such as mould height and required ejector stroke to ensure it is compatible with the selected machine

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Setting

Setting of the machine conditions may include setting the mould height on the machine, the clamp force, the mould safety system, the ejector system, the mould opening and closing distances, speeds and forces and the injection unit.

These settings may be performed automatically, using an electronic storage device to load settings from a previous run of this product, or may be performed by manually setting controls individually.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This unit of competency includes use of equipment and tools such as:

- hand carts and trolleys
- hoists/lifting equipment not requiring any special permits or licences
- basic hand tools
- relevant personal protective equipment.

Hazards

Typical hazards include:

- hazardous materials
- manual handling hazards
- hot surfaces.

Anticipate problems

Anticipate problems includes taking a proactive approach to a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures, and endeavouring to learn from the problem so that it does not recur.

Typical die setting problems may include:

- lack of cleaning of die surface and cooling channels, leading to corrosion
- inadequate fitting of the dies to the platens, causing poor alignment or movement during production
- fine adjustments of die movements, to optimise production.

All operations are performed in accordance with procedures.

Variables

Key variables, and their causes, to be monitored include:

- time/effort required to set a die
- number of attempts to produce a first off within specification
- the need to reset/adjust a die during then production run.

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Unit Sector(s)

Not applicable.

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PMBPREP305B Change extrusion die and setup

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the removal and refitting of dies, pins, sizing dies (calibrator), vacuum blocks and seals in preparation for production. This competency applies to extrusion, and similar, dies. For all other dies use PMBPREP304A Change equipment dies.

This competency is typically performed by advanced operators demonstrating some relevant theoretical knowledge and using a range of well-developed skills requiring some discretion and judgement.

Application of the Unit

Application of this unit

This competency applies to advanced operators who are responsible for changing setups to meet the production schedule for an extrusion line process. Setup changes means the work involving the extrusion die and sizing equipment only. The key factors are the safe and precise removal and installation.

The operator will:

- plan and prepare the change, including informing others selecting dies that match product/process specification removing, cleaning and storing the existing dies
- fit the replacement die according to specification testing the changeover and fine tuning as needed.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Prepare to change dies or cores.	1.1 Plan process for closing down machinery and inform relevant personnel. 1.2 Take last-off samples as required for die reports. 1.3 Select dies or cores to match product/process specification. 1.4 Implement measures to control identified hazards in line with procedures and duty of care.
2. Shut down extruder.	2.1 Stop downstream equipment. 2.2 Stop feed, drop temperatures, stop vacuum pump and purge the extruder. 2.3 Activate isolating locks, disconnect power to heaters.
3. Change setup.	3.1 Remove, clean and store die according to workplace procedures. 3.2 Fit replacement die ensuring that locating devices and marks are matched and securing devices are installed and tightened to specification. 3.3 Remove and re-fit calibrator sleeve and seals as required. 3.4 Set heats according to pre-start procedures.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
4. Restart and test-run the new setup.	4.1 Check operation of die against product quality 4.2 Compare machine setting ranges against documented requirements. 4.3 Check the first-off sample for required standards 4.4 Fine-tune settings and other production variables as required. 4.5 Note variances between standard operating procedures and actual production run. 4.6 Complete workplace documentation and report to appropriate personnel.
4. Anticipate and solve problems	4.1 Recognise a problem or a potential problem. 4.2 Determine problems needing priority action. 4.3 Refer problems outside area of responsibility to appropriate person, with possible causes. 4.4 Seek information and assistance as required to solve problems. 4.5 Solve problems within area of responsibility 4.6 Follow through items initiated until final resolution has occurred.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls applied to the extrusion process. Application of approved hazard control, safety procedures, the use of PPE in relation to handling materials, equipment operation and clean up.

Knowledge as a basis for solving processing and material problems, including:

- impact of incorrect or faulty fitting
- production work-flow sequences

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- correct selection and use of equipment and procedures
- hazards of the removal and fitting process and appropriate hazard control procedures
- the performance of die and cores
- relevant information and workplace records
- safety precautions appropriate to the task.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE
- safely handle products and materials
- read relevant safety information and apply safety precautions appropriate to the task.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators. Writing is required to the level of completing workplace forms and production reports.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to interpret and use dimensional and tolerance information relating to the die, design drawings and specifications.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

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It is essential that competence is demonstrated in the ability to perform a die-change smoothly and methodically, which will put the extruder back into full production of in-specification product in standard time. In particular it is essential that the operator can:

- select, install and check the performance of die and cores
- locate, interpret and apply relevant information
- maintain workplace records
- identify and safely handle products and materials
- apply safety precautions appropriate to the task
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. For example, look to see that production standards are met consistently.

Assessment method and context

It is preferred that assessment takes place on an industrial extruder in a work environment.

Competence in this unit may be assessed:

- on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

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Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the selection and fitting of dies and cores.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry which use extrusion type dies and cores. It includes the operation of all relevant ancillary equipment.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- hand carts and trolleys
- hoists/lifting equipment not requiring any special permits or licences basic hand tools
- hand tools
- relevant personal protective equipment.

Hazards

Typical hazards include:

- hazardous materials
- manual handling hazards
- hot surfaces.

Problems

Typical process and product problems may include:

- lack of cleaning leading to corrosion
- inadequate fitting
- fine adjustments to optimise production.

Variables

Key variables to be monitored include:

- fitting and adjustments to die
- adjustments to extruder settings
- quality of the product against product specifications.
-

Unit Sector(s)

Not applicable.

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PMBPROD221B Operate rotational moulding equipment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the operation of equipment, including both rotating and 'rock and roll' modes, and the resolving of routine problems to procedure. It does not cover open flame equipment. (see *PMBPROD284B - Operate open flame moulding equipment*)

Application of the Unit

Application of this unit

This competency applies to operators who are required to undertake the routine operation of rotational moulding equipment. The key factors are the making of products to meet quality standards and workplace requirements. This competency is typically performed by operators working either independently or as part of a work team.

It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with OHS legislative responsibilities
- monitoring rotational moulding equipment operation and reporting process variations
- checking product for quality and conformity to specifications discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.
-

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.
1. Check work requirements.	1.1 Identify work requirements from production plan or request. 1.2 Check product, materials and equipment meet requirements for job(s). 1.3 Recognise requirements which may not be in accordance with usual practice. 1.4 Ask questions of appropriate person to confirm unusual practice. 1.5 Ensure housekeeping is to requirements. 1.6 Identify hazards associated with the job and take appropriate action. 1.7 Perform other pre-operational checks in accordance

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ELEMENT ELEMENT	PERFORMANCE CRITERIA The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.
	with procedures.
2. Operate rotational moulding equipment to procedures.	2.1 Check process is operating within required limits. 2.2 Check product is in specification and to required quality standard. 2.3 Ensure product is consistently ready for next operation. 2.4 Maintain supply of material(s) as required. 2.5 Demould products and store as required 2.6 Complete logs and records as required. 2.7 Collect and segregate scrap, trim and other materials as required. 2.8 Keep equipment and work area clean. 2.9 Pause machine cycle and perform emergency stop, as required.
3. Respond to routine problems to procedures.	3.1 Recognise known faults that occur during the operation. 3.2 Identify and take action on causes of routine faults. 3.3 Log problems as required. 3.4 Identify non-routine process and quality problems and take appropriate action.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Knowledge of and skills in the operation of rotational moulding equipment and main components sufficient for consistent production of quality products including:

- operation of rotational moulding equipment and components
- effects of shrinkage on material colour

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- production workflow sequences and materials demand
- reasons for checking process control panels and reporting readings which do not conform to the work instructions
- approved hazard control and safety procedures and the use of PPE in relation to handling materials
- equipment operation and cleanup
- potential effects of variations in raw materials and equipment operation in relation to quality of product
- waste management and importance of reusing non-conforming products wherever possible
- correct selection and use of equipment, materials, processes and procedures
- plan own work, including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the rotational moulding process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine rotational moulding faults such as: incorrect quantity of materials; contaminated materials/additives; equipment faults; mould damage; temperature/time faults; rotation speed/motion problems; wrong raw materials/additives; incorrect quantity of materials/additives; machine failure.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

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A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. For example, look to see that:

- rotational moulding production standards are met consistently
- upstream and downstream communication is timely
- effective operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie the problem is fixed or reported)
- all safety procedures are followed.

Assessment method and context

Assessment will occur on industrial rotational moulding equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

  - on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to operators working either independently or as part of a work team.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- hand tools
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Hazards

Typical hazards include:

- spills
- noise, light, energy sources
- humidity, air temperature, radiant heat, hot moulds
- hazardous substances
- stationary and moving machinery, parts and components
- manual handling hazards.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- equipment malfunction
- variations in temperature, pressure, rotation
- variations in materials or contamination of materials

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- mould damage
- routine rotational moulding faults
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials.

Variables

Key variables to be monitored include

- procedures for removing, fitting and setting moulds
- materials used in the rotational moulding process
- process temperatures
- cleanliness
- characteristics of melt flow.
-

Unit Sector(s)

Not applicable.

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PMBPROD235C Use materials and process knowledge to complete work operations

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the application of materials and process knowledge to the operation of the equipment, processes, materials and end product, so that work procedures and quality requirements can be met. It applies to workers in any sector of the industry.

This competency is typically performed by all operators working either independently or as part of a work team.

This unit of competency may be designated for a stream - see the Range Statement.

Application of the Unit

Application of this unit

This competency applies to operators who maintain an overview of the production process, collect and prepare materials for the production process and observe and make judgements about the end product. The key factors are the delivery of the right material to the right place at the right time and ensuring there is no contamination of the materials.

It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/ product will be made/completed
- discussing work progress with other workers planning which jobs have the higher priority
- utilising raw materials to produce products through a production process
- inspecting the products of the process and identifying routine production faults
- employing appropriate shutdown procedures.
-

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Locate materials, equipment and workplace documentation for production process.	1.1 Follow workplace documentation requirements relating to production processes. 1.2 Identify and locate the range of materials used and their physical forms. 1.3 Acquire necessary equipment and tools and identify appropriate work checking procedures. 1.4 Identify and follow safety requirements for the materials and process to be employed.
2. Follow production process.	2.1 Follow procedures for the production process. 2.2 Identify those parts of the production process where extra care and attention is required. 2.3 Identify and apply the operating principles behind the equipment to be used.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
3. Identify product features.	3.1 Inspect products for compliance with quality specifications. 3.2 Identify products in terms of end purpose and relationship to workplace production output and economic value. 3.3 Relate features of products to the production process.
4. Locate required equipment, materials and product storage.	4.1 Follow the correct workplace procedures and safety precautions for the storage of equipment, materials and products. 4.2 Identify and separate incompatible materials in accordance with workplace procedures and practices. 4.3 Ensure equipment is cleaned prior to return to storage. 4.4 Dispose of waste materials through approved means or product recycling.
5. Identify routine production and product faults.	5.1 Identify the causes of production faults and take appropriate restorative or reporting action. 5.2 Establish the basis for product faults and report or address (as appropriate) potential causes due to inappropriate production methods and materials quality.
6. Follow shutdown procedures	6.1 Differentiate between routine and emergency shutdown situations and procedures. 6.2 Demonstrate the procedures to be followed in an emergency shutdown of the process and the alert procedures that accompany that process. 6.3 Follow the appropriate procedures for routine shutdowns for breaks and other routine short term discontinuances. 6.4 Notify appropriate personnel of shutdowns and complete any workplace documentation.

Required Skills and Knowledge

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This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise out-of-specification products, process problems and materials faults.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job toapply and/or explain:

- impact of incorrect or faulty materials
- types of products made with different processes
- the changes to raw materials during the process
- production workflow sequences and materials demand
- focus of operation of work systems and equipment
- correct selection and use of equipment, materials, processes and procedures
- hazards of the materials and process and appropriate hazard control procedures.

Competence also includes the ability to:

- recognise the importance of material properties and qualities recognise the importance of process conditions
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. For example, look to see that:

- production standards are met consistently
- upstream and downstream communication is timely
- effective operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie the problem is fixed or reported)
- all safety procedures are followed.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

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Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- recognise the importance of material properties and qualities
- recognise the importance of process conditions
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel.
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. For example, look to see that:

- production standards are met consistently
- upstream and downstream communication is timely
- effective operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie the problem is fixed or reported)
- all safety procedures are followed.

Assessment method and context

Assessment will occur on industrial materials and processes and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- by use of an appropriate, industrial materials and processes
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

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This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry.

This competency unit includes the use of manual handling aids such as handcarts. It does not include the use of powered equipment/aids.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- basic hand tools required for opening of material packaging
- hand carts and trolleys
- hoists/lifting equipment not requiring any special permits or licences rules or callipers
- relevant personal protective equipment inventory and workplace records systems.

Hazards

Typical hazards include:

- material spills
- fumes, dusts/vapours
- hazardous materials

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- manual handling hazards
- machinery hazards.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- variations in materials
- contamination of materials
- variations in equipment operations
- product faults
- equipment breakdowns.
-

Unit Sector(s)

Not applicable.

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PMBPROD236C Operate hand held air/power equipment for production processes

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the operation of hand held air or power equipment to contribute to the production process and the assembly of materials and equipment in preparation for production.

Application of the Unit

Application of this unit

This competency applies to operators of hand held equipment used in the assembly and finishing of components as part of the production process. The key factors are the safe and effective utilisation of the equipment and conformance with workplace safety requirements. This competency is typically performed by all operators working either independently or as part of a work team.

It includes:

- checking the equipment for cleanliness and possible hazards, frayed cables or hoses, loose components or other difficulties
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- prioritising work and maintaining production throughput
- bringing together different components for assembly or disassembly
- drilling, grinding, cutting or otherwise dealing with products
- identifying and taking action on routine process problems
- completing logs and reports.
-

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify equipment and power requirements.	1.1 Match appropriate equipment for drilling, cutting and grinding to work applications. 1.2 Choose correct power and air sources, identifying and selecting correct voltage, amperage and air pressure. 1.3 Select correct lubrication and/or water separation equipment as required. 1.4 Inspect equipment for signs of damage or faults. 1.5 Select correct accessories in terms of suitability for purpose and operable condition.
2. Follow emergency shutdown procedures.	2.1 Identify the circumstances which would justify an emergency shutdown of equipment. 2.2 Identify appropriate switches and/or other shutoff

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ELEMENT ELEMENT	**PERFORMANCE CRITERIA** Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	apparatus. 2.3 Shut down equipment in an emergency. 2.4 Complete reporting required following an emergency shutdown.
3. Control hazards associated with using the equipment.	3.1 Identify potential hazards arising from power sources and/or compressed air. 3.2 Recognise process by-products which may cause damage to the operator, environment, products, raw materials, other equipment or personnel. 3.3 Follow procedures to control hazards.
4. Set up equipment according to procedures.	4.1 Check equipment settings, accessories and consumables for acceptable condition. 4.2 Check equipment for sharpness/wear as appropriate. 4.3 Use manufacturer or workplace instructions for equipment as the basis of work practices. 4.4 Correctly set-up equipment for the required production process. 4.5 Check equipment through the full operating range required for the task.
5. Use equipment for production processes.	5.1 Operate equipment within the parameters of the manufacturer or workplace instructions. 5.2 Use appropriate consumables including cooling and lubricating fluids where required. 5.3 Deal with dust, swarf, off cuts and other production by-products and waste.
6. Shut down equipment according to procedure.	6.1 Shut down equipment as required. 6.3 Dispose of any dust, swarf, off cuts and other production by-products and waste.
7. Store equipment appropriately.	7.1 Clean equipment prior to storage. 7.2 Tag or take appropriate steps to arrange repair or servicing of equipment as required. 7.3 Maintain storage areas to workplace standards.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of oranisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Knowledge of and skills in the operation of equipment and main components sufficient for consistent production of quality products including:

- impact of incorrect or faulty materials or tools
- production workflow sequences and materials demand
- focus of operation of work systems and equipment
- correct selection and use of equipment, materials
- processes and procedures
- hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as wrong materials, incorrect quantity of materials, contaminated materials, blunt or worn tools, tool or power failures.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg to determine that 20 components having 2 attachments each means that 40 attachments are required.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

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- recognise the importance of critical material properties and quantities
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. For example, look to see that:

- production standards are met consistently
- tools are handled correctly
- tools are correctly cleaned and stored
- faulty tools are identified and handed in for repair.

Assessment method and context

Assessment will occur while using industrial power tools and will be undertaken in a work like environment.

Competence in this unit may be assessed:

- on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

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Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to operators working either independently or as part of a work team.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- work stands
- portable air or power operated drills, grinders, cutters or saws
- impact wrenches
- hoists/lifting equipment not requiring any special permits or licences
- bolts, screws, rivets, etc
- vices, clamps and braces
- relevant personal protective equipment.

Hazards

Typical hazards include:

- frayed cables/hoses
- dusts/swarf
- metal and other shavings
- manual handling hazards
- equipment failures.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- tool malfunctions
- damaged leads or hoses
- incorrect tool selected
- worn or blunt tools/tool bits
- damaged tools
- non-supply of components or fittings
- incorrect supply of components or fittings
- material failures
- out-of-specification products.

Variables

Key variables to be monitored include:

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- tool speeds
- tool mass
- operating mediums
- condition of tools
- useability
- cleanliness.
-

Unit Sector(s)

Not applicable.

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PMBPROD240C Cut materials

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers preparation and operation of specialised equipment or procedures to cut materials to size, shape or to a pattern, and the resolving of routine problems to procedure.

Application of the Unit

Application of this unit

This competency applies to operators who are involved in the use of specialised equipment or processes to cut material. The key factors are the making of products to meet quality standards and workplace requirements. This competency is typically performed by operators working either independently or as part of a work team.

It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- setting up equipment
- preparing materials as required
- ensuring that safety procedures are applied to reduce the risks
- identifying and taking action on routine process problems
- completing logs and reports.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Check work requirements.	1.1 Identify work requirements from procedures. 1.2 Identify product, materials and equipment requirements for job(s). 1.3 Recognise hazards and adopt steps required to ensure safety. 1.4 Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1 Check safety gates and guards are in position and working. 2.2 Check raw materials are correct. 2.3 Undertake other pre-start checks in accordance with procedures.
3. Use tools/equipment.	3.1 Operate cutting tools/equipment to cut materials to procedures. 3.2 Monitor dimensions, quality and quantity of cuts. 3.3 Remedy faults and non-conformances by correcting operation or adjusting tools/equipment as required. 3.4 Collect material which is able to be recycled or

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	reused, separate and dispose of waste and scrap.
4. Resolve routine problems.	4.1 Identify likely faults that occur during the operation/task. 4.2 Identify and take action on causes of routine faults in accordance with procedures. 4.3 Make sure appropriate records and log books of equipment operations are maintained to meet procedures. 4.4 Identify non-routine problems and report to designated person.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability to:

- apply and/or explain different types of materials and their behaviour when cut, different cutting equipment and suitability for materials
- identify controls of cutting equipment
- list and describe routine faults in products, routine problems in process
- distinguish between causes of faults such as materials deficiencies, heat, changes to materials during the cutting process, equipment adjustments/set-up, equipment maintenance requirements
- original manufacturer instructions and guidelines for the safe use of the cutting tools/equipment
- relevant procedures relating to safe working practices prescribed for the equipment
- local OHS legislation and/or regulations
- site-specific instructions based on production requirements.

Language, **literacy and numeracy requirements**

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This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. For example, look to see that:

- material cutting production standards are met consistently
- upstream and downstream communication is timely and effective
- procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie the problem is fixed or reported)
- all safety procedures are followed.

Assessment method and context

Assessment will occur using industrial materials, equipment and scenarios and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

  - on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios

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- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to operators working either independently or as part of a work team.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- guillotines, power saws, jig saws, band saws, thermal cutting devices
- controller, such as PLC if fitted
- hand tools as required
- relevant personal protective equipment.

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Hazards

Typical hazards include:

- fibres and dusts, airborne and handled
- manual handling hazards
- power tools, leads and power supplies
- stationery and moving machinery, parts and components.

Problems

'Respond to routine problems means apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- pattern, eg pattern incorrect, marking errors
- equipment, eg wear and breakage, temperature variations, loss of power or drives, controller sequence, timer issues
- process, eg sequencing problems.

Variables

Key variables to be monitored include:

- material characteristics
- material availability
- type of cutting equipment
- cutting edge condition.
-

Unit Sector(s)

Not applicable.

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PMBPROD241C Lay up rubber lining or lag pulleys

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the laying-up of rubber and similar materials to line a variety of components or vessels of varying sizes, including the lagging of pulleys.

Application of the Unit

Application of this unit

This competency applies to operators who prepare materials and rubber line or lag a variety of components and larger vessels. The lining of vessels or tanks is to retard abrasion, impact or corrosion. The re-lagging of pulleys for conveyors provides a positive drive. The key factors are the preparation of the surfaces to be lined/lagged and the successful application of the rubber to the surfaces without contaminating the materials. This competency is typically performed by operators working either independently or as part of a work team.

The operator will:

- review hazards and controls
- plan the lining/lagging task
- determine the appropriate materials and lay up sequence
- apply the lining/lagging materials
- identify and take action on routine process problems
- complete logs and reports.

Note that this competency unit covers repairs carried out in a workshop or other off-site facility. If the work involves on site work, then this competency should be considered in conjunction with *MSAPROD363A Organise on site work*.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Some enterprises may require the achievement of certain other competency units in accordance with workplace safety requirements. Where rubber lining is to be carried out in a confined space, this unit also requires the achievement of *MSAPER205 Enter confined space*.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Plan rubber lining or lagging work.	1.1 Review specifications and work order documentation. 1.2 Identify hazards and risk controls, including emergency evacuation and adequate ventilation, including breathing apparatus where required. 1.3 Plan work including materials, sequences, times and process stages. 1.4 Plan to minimise downtime, economically use materials and meet repair quality specifications. 1.5 Assemble equipment, tools and materials required, checking them for condition, quality and compliance

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	tags.
2. Prepare surfaces for rubber lining or lagging.	2.1 Lay out materials in an appropriate contamination free area. 2.2 Ensure materials are clean and free of debris and damage. 2.3 Identify non-conforming materials and report as required. 2.4 Examine component, vessel or pulley and ensure the surfaces to be lined or lagged are free of defects and contaminants. 2.5 Plan the sequence for application of the adhesives and materials. 2.6 Prepare lining or lagging surfaces. 2.7 Monitor surface coatings for setting time and manage the staggered supply of adhesives and materials, where appropriate.
3. Lay up rubber lining or lagging.	3.1 Ensure adequate ventilation is provided and monitored during the laying up process. 3.2 Monitor any confined space activity and conform to regulations and procedures. 3.3 Position lining/lagging segments according to the lay-up plan. 3.4 Exclude entrapped air and ensure complete contact between the lining/lagging and surface is obtained. 3.5 Ensure joins are sealed and adhered properly with no gaps or overlaps. 3.6 Check for slips, sagging or other separation of the lining/lagging from the surface. 3.7 Ensure lining/lagging material is finished off as required at the extremities. 3.8 Cure rubber lining/lagging where appropriate.
4. Clean work area.	4.1 Clean, inspect and store tools and equipment used. 4.2 Tag unserviceable tools and equipment, identify faults and inform relevant personnel. 4.3 Clean work area and return to approved condition. 4.4 Dispose of waste or recycle according to procedures.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	4.5 Complete appropriate workplace documentation.
5. Respond to routine problems to procedures.	5.1 Recognise known faults that occur during the operation. 5.2 Identify and take action on causes of routine faults. 5.3 Log problems as required. 5.4 Identify non-routine process and quality problems and take appropriate action.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls applied to the lining process. Application of approved hazard control, safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up.

Knowledge of and skills in the lining/lagging operation sufficient for consistent production of quality products including:

- impact of incorrect or faulty materials
- production workflow sequences and materials demand
- focus of operation of work systems and equipment
- correct selection and use of equipment, materials, processes and procedures
- hazards of the materials and process and appropriate hazard control procedures especially the use of ventilation, breathing apparatus and requirements for confined space entry and emergency escape
- requirements of good manual handling practices
- need for scaffolding and safe work practices at heights.

Competence also includes the ability to:

- plan own work including predicting consequences and identifying improvements
- monitor equipment operation

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- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the lining/lagging process.

Competence includes the ability to distinguish between causes of faults such as:

- wrong raw materials/additives/catalyst
- incorrect quantity of materials/additives/catalyst
- contaminated materials/additives/catalyst.

Language, literacy and numeracy requirements

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg to interpret specifications and make and interpret measurements and shapes.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency evacuation procedures.

Consistent performance should be demonstrated. For example, look to see that:

- rubber layup production standards are met consistently
- communication is timely and effective
- work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)

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- all safety procedures are followed.

Assessment method and context

Assessment will occur on industrial equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- by use of an appropriate, industrial lining/lagging situation
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to a variety of internal and external work environments served by the rubber industry and includes work done in a production facility and on site.

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This competency unit includes the use of manual handling of lining materials, the use of scaffolding and can involve activities within the definition of 'confined space'. (Note that separate competencies, and/or licensing requirements may apply for these activities.)

Lining materials includes rubber compounds which includes green (uncured) sheets, pre-cured rubber sheets and other polymer sheets. Lining or lagging will generally be of metal items, but may include application to composites, concrete and other non-metallic structures, vessels, pulleys or plant items.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- hand tools (eg spanners, wrenches and hammers)
- knives and other trimming devices
- hoists/lifting equipment not requiring any special permits or licences
- rollers and other surface compression tools
- ventilation equipment (eg fans)
- relevant personal protective equipment, including 'breathers' as required.

Hazards

Typical hazards include:

- spills
- dusts/vapours
- hazardous materials (eg adhesives, solvents and other chemicals)
- manual handling hazards
- knife hazards
- noxious, toxic fumes or inflammable fumes
- confined spaces
- working at heights.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- variations in materials
- incorrectly cut material shapes
- contamination of materials
- contamination of the surfaces to be lined or lagged
- physical size and complexity of some components
- entrapped air
- gaps between lining segments
- inappropriate laps or joins.

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Variables

Key variables to be monitored include:

- compatibility of materials, adhesives, solvents and cleaning agents
- cleanliness and condition of lining/lagging materials
- affect of surface condition of the component on the quality of the lining/lagging.
-

Unit Sector(s)

Not applicable.

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PMBPROD242A Bond polymers to surfaces

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the joining of a solid polymer to another solid surface using adhesives, cohesives, solvents or other joining materials. The polymer may be thermoplastic or cured or uncured thermoset.

Application of the Unit

Application of this unit

This competency applies to operators who are required to join polymers to another surface. It is typically performed by operators working either independently or as part of a work team. The operator will:

- check the surface of products to be joined for suitability or contamination
- check materials for conformity to job requirements
- apply the joining material(s)
- notice any problems and take required actions
- deal with non-conforming products, waste and scrap
- complete logs and reports.

They may record key variables such as work conditions and production rate and reasons for interruptions.

This unit does not include:

- significant surface preparation - see *PMBPROD248C Prepare surfaces for coating*
- heat curing of bonded material - see *PMBPROD265 Operate portable vulcanising equipment, PMBPROD375B Vulcanise products using an autoclave*.
-

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Check work requirements.	1.1 Identify work requirements from production plan or request. 1.2 Select and check appropriate equipment or tool/s, techniques and materials to be used. 1.3 Recognise requirements which may not be in accordance with usual practice. 1.4 Ask questions of appropriate person to confirm unusual practice. 1.5 Ensure housekeeping is to requirements. 1.6 Identify hazards associated with the job and take appropriate action. 1.7 Perform other pre-operational checks to procedures
2. Prepare materials for	2.1 Check substrate for suitability.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
joining.	2.2 Clean/activate substrates to procedures as required.
3. Apply joining materials.	3.1 Prepare joining materials. 3.2 Apply joining materials to substrate(s) as required. 3.3 Monitor drying/setting as appropriate 3.4 Apply subsequent material/coats as required. 3.5 Complete logs and records as required. 3.6 Keep equipment and work area clean.
4. Join materials.	4.1 Set up required jigs and equipment for joining. 4.2 Bring surfaces together when appropriate. 4.3 Ensure intimate and continuous contact between surfaces. 4.4 Apply required conditions to join until joining process is complete.
5. Respond to routine problems in accordance with procedures.	5.1 Recognise known faults that occur during the operation. 5.2 Identify and take action on causes of routine faults. 5.3 Log problems as required. 5.4 Identify non-routine problems and report to designated person.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of organisation procedures, quality requirements and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risk using the hierarchy of controls applied to the coating process. Application of approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup.

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Knowledge and skills in the operation of the joining process and equipment sufficient for consistent production of quality products, including:

- correct selection and use of equipment or tool/s, materials, processes and procedures
- accurately monitoringequipment operation and product quality
- reasons for checking conditions and taking action when outside of the normal range of process variability
- identifying factors which may affect product quality or production output and appropriate remedies
- potential effectsof variations in materials and equipment operation in relation to quality of product
- joining behaviour of polymers to relevant substrates and the role of adhesives,cohesives, solvents and other materials
- waste management and knowing the importance of reusing non-conforming products wherever possible
- basic pre-blending of materials
- methods of application of joining materials
- required surface preparations and their importance to joining
- types of adhesives, cohesives, solvents and their differences, uses, where they may or may not be used and range of application
- critical factors for different types of joining processes such as gap filling, aesthetics, structural strength etc.

Competence also includes the ability to:

- plan production workflow sequences and materials demand
- plan own work. including predicting consequences and identifying improvements
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the coating process.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg to determine the amounts of materials needing to be blended for a 2 pot adhesive.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

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A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- apply the required skills and knowledge to complete adhesive bonding jobs
- apply approved procedures.

Consistent performance should be demonstrated. For example, look to see that:

- joining production standards are met consistently
- all safety procedures are followed.

Assessment method and context

Assessment will occur using industrial bonding situations and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- by using appropriate joining materials, situations and tools
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

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Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all joining operations where a solid polymer is joined to another substrate. It includes the operation of all relevant additional equipment where that equipment is integral to the joining process.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Substrate suitability

Substrate suitability includes:

- surface soundness
- surface preparation such as grit blasting, etching, sanding, buffing, scraping, machining or other preparations
- substrate porosity
- surface pits, protrusions or other irregularities.

Joining materials

Joining materials include:

- adhesives (such as commercially available materials 'Loctite, Sikaflex, Plexus)
- cohesives
- solvents (such as aliphatics, ketones, aromatics)
- other materials (such as glues, fillers)

Joining material preparation

Joining material preparation includes:

- mixing one pot materials to achieve homogeneity
- blending two (or more) pot material components
- thinning (eg with solvent) if required
- measuring components for blends.

Joining material application

Joining material application to include:

- correct application rate

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- even application
- economical application
- correct application method.

Contact between surfaces

Contact between surfaces may be effected by:

- use of hand rollers
- use of presses
- may be achieved as part of the curing process where this is done under pressure
- other relevant equipment.

Tools and equipment

This competency includes use of equipment and tools such as:

- application equipment (eg brushes, syringes, pipettes, spray guns, application scrapers)
- additional equipment (eg vapour extraction, application booths)
- manual handling aids (eg hand carts, trolleys)
- hoists/lifting equipment not requiring any special permits or licences
- relevant personal protective equipment.

Hazards

Typical hazards include:

- spills and splashes
- toxic fumes or vapours
- hazardous materials
- manual handling hazards
- flammable vapours.

Problems

'Respond to routine problems' means apply known solutions to a limited range of predictable problems. Typical process and product problems may include:

- incorrect selection of joining materials
- variations in materials
- contamination of joining materials or substrates
- inappropriate application of materials
- dust and other contamination
- drying rates
- film thickness variation
- film application rates
- coverage
- tack (too much, not enough, long leg/short leg)
- products with substrate or other faults.

Appropriate action for non-routine problems may be reporting to designated person or other action specified in the procedures.

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Variables

Key variables to be monitored include:

- application patterns
- adhesive consistency
- substrate preparation, condition and finish
- adhesive viscosity
- solvent/thinner blend ratios.
-

Unit Sector(s)

Not applicable.

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PMBPROD247C Hand lay up composites

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers preparation and operations for hand laying up of composite materials to form a simple product and the resolving of routine problems to procedure.

Application of the Unit

Application of this unit

This competency applies to operators who are involved in the production of products by hand lay up of composite materials. This competency is typically performed by operators working either independently or as part of a work team. The operator:

- selects and prepares the materials required to form a product to the required specifications
- sets up moulds
- applies materials as required
- ensures that safety procedures are applied to reduce the risks
- notices any problems and takes required action (eg reporting)
- completes logs and reports as required.

They may record key variables such as mould conditions and production rate and reasons for interruptions.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Check work requirements.	1.1 Identify work requirements from production plan or request. 1.2 Check product, material, and equipment meet requirements for the job(s). 1.3 Recognise requirements which may not be in accordance with usual practice. 1.4 Ask questions of appropriate person to confirm unusual practice. 1.5 Identify hazards associated with the job and take appropriate action. 1.6 Perform other pre-operational checks in accordance with procedures.
2. Set up mould and materials as required.	2.1 Set up mould ready for production. 2.2 Ensure materials are available in the form and quantities required. 2.3 Ensure safety equipment is available and fit for use.
3. Hand lay up composites.	3.1 Apply materials to the mould to specification. 3.2 Monitor product/process quality. 3.3 Make adjustments or seek assistance to remedy faults

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	and non-conformity as required. 3.4 Adjust work to minimise scrap and trim.
4. Respond to routine problems in accordance with procedures.	4.1 Recognise known faults that occur during the operation. 4.2 Identify and take action on causes of routine faults. 4.3 Log problems as required. 4.4 Identify non-routine process and quality problems and take appropriate action.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of an operational knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults. For example, excess resin will only add weight and weaken the finished product. Therefore care needs to be taken to ensure the correct resin to fibre ratio is used.

Knowledge of organization procedures, relevant regulatory requirements, and the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls applied to the hand lay up process. Application of approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup.

Knowledge of and skills in the operation of hand lay up equipment and the main components sufficient for consistent production of quality products including:

- production workflow sequences and materials demand
- accurately monitoring equipment and product quality
- understanding the potential effects of variations in raw materials and equipment in relation to quality of product
- waste management and understanding the importance of reusing non-conforming products wherever possible
- correct selection and use of equipment, materials, processes and procedures
- identify factors which may affect product quality or production output and appropriate remedies.
- setting up moulds

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- preparation of resins, including mixing as required
- preparation of fibre reinforcement, including cutting and trimming
- use of composites materials, including gel coats, resins and fibres
- methods of application of composite materials to the mould by hand lay up.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the moulding process.

Language, literacy and numeracy requirements

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of reading tables of figures and graphs (and applying the resultant information), using formula percentages/ratios to determine the required mass of an additive (catalyst, pigment etc.) and similar manipulations and interpretation.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- apply the required skills and knowledge to the hand lay up process
- apply approved procedures.

Consistent performance should be demonstrated. For example, look to see that:

- composites production standards are met consistently
- all safety procedures are always followed.

Assessment method and context

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Assessment will occur during the hand lay up process for composites and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- through use of industrial hand lay up composite manufacture, using jobs of appropriate complexity
- in a situation allowing for operation under all normal and a range of abnormal conditions
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the use of equipment and materials to form composite products using hand lay up processes. It includes the operation of all relevant additional equipment where that equipment is integral to the hand lay up process.

Procedures

All operations are performed in accordance with procedures.

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Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- open moulds for composite products
- hand mixing equipment and stirrers
- knives and cutters to trim fibres
- hand application tools, rollers, brushes, etc
- relevant personal protective equipment.

Hazards

Typical hazards include:

- hazardous materials and vapours
- manual handling hazards
- fire hazards due to flammable nature of resins used
- knife hazards
- glass (and other) fibre hazards (inhalation and skin penetration)
- slip hazards (spilled resin).

Problems

Respond to/rectify 'non-routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process problems may include:

- cracks, dents or imperfections of the mould
- incorrect resin ratios
- contamination of materials
- shifting of fibres before resin laid
- stacking of fibre and resin sequence problems.

Typical product problems may include:

- voids
- poor surface finish
- colour contamination
- release from mould damage.

Appropriate action for non-routine problems may be reporting to designated person or other action specified in the procedures.

Variables

Key variables to be monitored include:

- ambient temperature
- air flow/ventilation rate
- viscosity of resin
- time since resin mixed *vs* pot life of mix
-

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Unit Sector(s)

Not applicable.

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PMBPROD248C Prepare surfaces for coating

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the preparation of surfaces for the application of adhesives, primers, surface coatings or finishes by hand or machine and the resolving of routine problems to procedure.

Application of the Unit

Application of this unit

This competency applies to operators who are involved in the preparation of surfaces prior to the application of adhesives, primers or surface finishes. This competency is typically performed by operators working either independently or as part of a work team.

The operator:

- checks product for quality and conformity to specifications
- checks raw material and equipment required
- notices any problems and takes required action (eg reporting)
- deals with non-conforming products, waste and scrap
- completes logs and reports.

They may record key variables such as equipment conditions and production rate and reasons for interruptions.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Check work requirements.	1.1 Identify work requirements from production plan or request. 1.2 Check product, materials and equipment meet requirements for job(s). 1.3 Identify and exclude sources of contamination. 1.4 Ask questions of appropriate person to confirm unusual practice. 1.5 Identify hazards associated with the job and take appropriate action. 1.6 Perform other pre-operational checks in accordance with procedures.
2. Prepare surface in accordance with procedures.	2.1 Check process is within required limits. 2.2 Prepare surface as required. 2.3 Check product is to required standard. 2.4 Maintain supply of material(s) as required. 2.5 Complete logs and records as required. 2.6 Keep equipment and work area clean.
3. Respond to routine problems in accordance	3.1 Recognise known faults that occur during the

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
with procedures.	operation. 3.2 Identify and take action on causes of routine faults. 3.3 Log problems as required. 3.4 Identify non-routine problems and report to designated person.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of an operational knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of organization procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls applied to the process. Application of approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup.

Knowledge of and skills in surface preparation equipment and main components sufficient for consistent production of quality products including:

- production workflow sequences and materials demand
- accurately monitoring equipment operation and product quality
- the potential effects of contamination on surface quality
- surface finish measurement techniques
- equipment, tools and consumables required to deliver the specified surface finish
- different substrates and their preparation requirements
- appropriate surface finish techniques for the substrates used
- typical problems with each substrate
- correct selection and use of equipment, materials, processes and procedures (such as the combination of surface finish technique and the appropriate substrate).

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the finishing process.

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Language, literacy and numeracy requirements

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- apply the required skills and knowledge to prepare surface for coating
- apply approved procedures.

Consistent performance should be demonstrated. For example, look to see that:

- finishing production standards are met consistently
- all safety procedures are followed.

Assessment method and context

Assessment will occur using industrial surface preparation equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- by using appropriate, industrial equipment requiring demonstration of operation and emergency stop procedures
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

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In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the processes required to prepare surfaces for application of surface coatings to specification. It includes the operation of all relevant additional equipment where that equipment is integral to the surface preparation process.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- hand finishing tools
- scrapers
- sandpaper
- buffs

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- polishes
- relevant personal protective equipment.

Hazards

Typical hazards include:

- spills
- hazardous materials and vapours (such as fumes from solvents or degreasers, or dust from sanding)
- moving equipment
- manual handling hazards.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process problems may include:

- wear and breakage
- overuse of tools, requiring rework
- incorrect substrate used
- incorrect measurement of surface finish.

Typical product problems may include:

- contamination of surface prior to polish
- damage to polished surface.
-

Unit Sector(s)

Not applicable.

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PMBPROD265C Operate portable vulcanising equipment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the application of technical expertise, work planning and problem solving to set up and operate portable vulcanising equipment.

This competency is typically performed by operators working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to operators who set up and operate portable vulcanising equipment either in a production facility or an on-site work environment. The key factors are the establishment of the appropriate safe working environment, obtaining the necessary power and other supplies, conducting vulcanising operations and assessing and taking appropriate action at the end of the operations.

It includes:

- planning the curing job
- identifying hazards and applying appropriate controls
- obtaining all necessary clearances and permissions for site work
- setting up equipment and materials
- conducting vulcanising operations
- assessing the finished work and identifying and taking action on routine process problems
- completing logs and reports.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

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This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify work requirements for vulcanising operations.	1.1 Identify the job and vulcaniser characteristics and product quality outcomes required. 1.2 Obtain specifications relevant to the material being vulcanised. 1.3 Identify and obtain equipment and materials required for the vulcanising process. 1.4 Identify hazards associated with the job and take appropriate action. 1.5 Check materials, ancillary supplies, and equipment for quality, access and condition. 1.6 Identify and check emergency stops, gauges, guards and controls.
2. Plan vulcanising operations.	2.1 Identify time, pressure and temperature requirements. 2.2 Plan the task sequences 2.3 Plan for waste management, maintenance and housekeeping requirements.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
3. Prepare vulcanising equipment.	3.1 Check vulcaniser, ancillary, equipment and attachments are fit for purpose. 3.2 Set up vulcanising press according to procedures. 3.3 Set equipment control parameters to specifications. 3.4 Obtain appropriate clearances for vulcanising to commence.
4. Conduct and monitor vulcanising operations.	4.1 Start the unit and commence vulcanising. 4.2 Monitor the unit operation throughout the entire process 4.3 Note and report non-conformity to specifications to procedures. 4.4 Make adjustments as required. 4.5 Shut down unit when cycle completed. 4.6 Follow procedure to disassemble equipment as required. 4.7 Assess the outcome of the vulcanising process and take remedial action as necessary and report to the appropriate person. 4.8 Brand splice as per company policy 4.9 Clean up, lubricate and adjust equipment as required. 4.10 Complete waste removal or recycling as required.
5. Respond to routine problems to procedure.	5.1 Recognise known faults that occur during the operation. 5.2 Identify and take action on causes of routine faults. 5.3 Log problems as required. 5.4 Identify non-routine process and quality problems and take appropriate action.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

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Knowledge of organization procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls applied to the vulcanising process. Application of approved hazard control, safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup.

Knowledge of and skills in the operation of portable vulcanising equipment and main components sufficient for consistent production of quality products including:

- importance of correct selection and use of equipment, materials, processes and procedures
- identifying the function of vulcanising equipment, components and the materials used
- describing changes to materials during the vulcanising process
- explaining the impact of vulcanising speed, pressure, time, temperature and tension on product quality and production output
- describing the role of heat and pressure in relation to providing strength, stiffness, resistance to deformation, fatigue and abrasion
- explaining any differences in vulcanising processes and additives for natural, synthetic and mixed rubber compounds
- deciding if they (the operator) are able to rectify the fault or if assistance is required
- explaining the effect of unauthorised or emergency shutdown of equipment on the vulcanising process
- understand the underlying risks in the process and how best to manage them.

Competence includes the ability to:

- plan own work sequence, including identification of key checkpoints for equipment monitoring and product quality checks
- operate equipment and monitor product quality
- identify factors which may influence product quality and production output and appropriate remedies
- make appropriate authorised alterations to own work plan and equipment to maintain both product quality and required production output
- locate, interpret and apply relevant information and maintain workplace records
- identify and safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Distinguish between causes of faults such as:

- equipment condition
- materials (eg. contaminated or wrong raw materials/additives/catalyst)
- process conditions (eg incorrect temperatures or pressures and entrapped air in the vulcanised area).

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

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Basic numeracy is also required, eg to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- understand the inherent risk associated with using a vulcaniser and the potential consequences of incorrect use
- understand procedures
- understand the importance of critical material properties and quantities
- recognise potential situations requiring action
- implement appropriate action and explain logic.

Consistent performance should be demonstrated. For example, look to see that:

- production standards are met consistently
- wire or reinforcing is not visible in the finished product
- bonding is achieved in accordance with specifications.

Assessment method and context

Assessment will occur on industrial equipment in a work-like environment.

Competence in this unit may be assessed:

- by using an appropriate, portable vulcanising equipment
- in a situation allowing for the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

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Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments and sectors within the rubber industry. It includes the operation of all relevant additional equipment where that equipment is integral to the vulcanising process.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This unit of competency includes use of equipment and tools such as:

- portable vulcanising equipment (including dispersion plates, pressure bags, edge bars, controllers)
- knives and other rubber cutting and shaping equipment
- hoists/lifting equipment not requiring any special permits or licences
- manual handling aids such as handcarts
- relevant personal protective equipment
- powered equipment/aids.

Hazards

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Typical hazards include:

- pressure
- heat and hot rubber
- chemical splashes or spills
- dust or vapours/fumes
- manual handling hazards
- knife hazards.

Task sequences

Task sequences include:

- location of vulcaniser
- process monitoring
- quality checks.

Monitoring of vulcanisation

Monitoring of vulcanisation includes noting:

- times,
- vulcanisation quality,
- equipment operating temperatures and times
- additional pressures applied.

Problems

'Respond to routine problems' means 'apply known solutions to a limited range of predictable problems'. Typical process and product problems may include:

- incorrect vulcaniser set-up
- variations in materials
- contamination of materials
- unsuccessful vulcanising processes
- entrapped gasses
- wire or reinforcing exposure
- inappropriate material specification.

Variables

Key variables to be monitored include:

- heat
- pressure
- time
- tension.
-

Unit Sector(s)

Not applicable.

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PMBPROD321B Produce rotational moulded products

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the operation and adjustment of rotational moulding processes and the solving of non-routine problems. This does not cover open flame equipment.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

Application of the Unit

Application of this unit

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of rotational moulding equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems.

It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine rotational moulding equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.
-

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has the prerequisite of *PMBPROD221A Operate rotational moulding equipment.*

Employability Skills Information

Employability Skills

The required outcomes described in this unit contain applicable Employability Skills. The Employability Skills Summary of the qualification(s) in which this unit is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Plan own work requirements.	1.1 Identify equipment and processes used for production process and upstream and downstream operations from production plan or request. 1.2 Identify materials required, including additives. 1.3 Recognise hazards and follow appropriate hazard control/minimisation methods. 1.4 Identify and check emergency stops, safety gates,

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	guards and controls. 1.5 Identify requirements for materials, quality, production and equipment checks. 1.6 Identify materials, waste management and housekeeping needs.
2. Start up rotational moulding process.	2.1 Determine equipment requirements. 2.2 Set process to specifications as required. 2.3 Check rotational moulding equipment settings and adjustments are as required. 2.4 Check materials are correct. 2.5 Discard, or make adjustments to the process for, non-conforming materials. 2.6 Set up date, batch and materials markings to specifications, as required. 2.7 Complete other pre-start checks in accordance with procedures. 2.8 Start up rotational moulding process.
3. Operate and make adjustments as required to the rotational moulding process.	3.1 Operate rotational moulding equipment, noting key variables. 3.2 Monitor controls/displays/terminals for production/process data. 3.3 Monitor product/process quality in accordance with procedures. 3.4 Make adjustments to remedy faults and nonconformity to standard as required. 3.5 Maintain continuity of process. 3.6 Collect and reprocess/discard scrap/trim and other materials in accordance with procedures. 3.7 Clean, adjust and lubricate equipment as required. 3.8 Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Anticipate and solve problems	4.1 Recognise a problem or a potential problem. 4.2 Determine problems needing priority action. 4.3 Refer problems outside area of responsibility to appropriate person, with possible causes. 4.4 Seek information and assistance as required to solve

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	problems. 4.5 Solve problems within area of responsibility. 4.6 Follow through items initiated until final resolution has occurred.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of organization procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job toapply and/or explain:

- products, materials and material characteristics
- behaviour of materials in relation to heat, rotation and time
- quality requirements at each production stage
- function and operating principles of rotational moulding equipment, machine components and ancillary equipment
- impact of machine speed, temperature, time during heating and cooling cycles on product quality and production output
- nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which affect machine operation and product development
- rotational moulding cycle and the importance of machine set-up and warm-up for effective processing of materials
- safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
- the hierarchy of control including engineering controls
- impact of variations in raw materials and equipment operation in relation to final productchanges to materials at various stages of production
- waste management and importance of non-conforming materials
- polymer properties and their interactions with process conditions
- relationships between polymer properties and process conditions
- changes to polymer properties to better suit process requirements
- product problems related to polymer properties

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- product problems related to process conditions
- adjustments to process conditions to meet polymer and product requirements.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- distinguish between causes of faults.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- identify critical materials properties and rotational moulding process characteristics in relation to the process requirements and the end product.

Consistent performance should be demonstrated. For example, look to see that:

- production quality and output standards are met consistently
- the process runs consistently and smoothly.

Assessment method and context

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Assessment will occur on an industrial rotational moulding machine(s) equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to rotomoulding systems, including fixed spindle, single spindle, multiple spindle and shuttle, swing and carousel type machines. It includes the operation of all relevant additional equipment where that equipment is integral to the rotational moulding process.

Procedures

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All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- hand tools used in the rotational moulding process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Hazards

Typical hazards include:

- noise, light, energy sources
- manual handling
- humidity, air temperatures, radiant heat, hot moulds
- stationary and moving machinery, parts and components.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

- routine and non-routine product rotational moulding faults
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials
- processing problems.

Causes of faults

Causes of faults include:

- short mouldings
- sink marks
- voids
- burn marks
- mica
- splash marks
- warping
- silver streaking
- blistering
- flow marks
- poor surface finish
- windows
- erratic cycles

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- poor colour dispersion
- rotation damage
- colour contamination
- black spots
- incorrect quantity of materials
- contaminated materials.

Variables

Key variables to be monitored include:

- cycle time according to external temperatures and humidity
- operating temperatures
- type of heating used
- cooling time
- speed of rotation/movement
- pattern of movement
- colour of product
- product integrity and general conformance to specification/sample.
-

Unit Sector(s)

Not applicable.

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PMBPROD323C Produce powder coated products

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the operation of powder (dry) coating equipment, including pre-treatment, racks, overhead tracks, hand and automatic spray equipment and ovens, and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

Application of the Unit

Application of this unit

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of powder coating equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems.

It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are re-used where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine powder coating equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.
-

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

The required outcomes described in this unit contain applicable Employability Skills. The Employability Skills Summary of the qualification(s) in which this unit is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Plan own work requirements.	1.1 Identify equipment and processes used for production process and upstream and downstream operations from production plan or request. 1.2 Identify materials colour, grade and quantity required. 1.3 Recognise hazards and follow appropriate hazard control/minimisation methods. 1.4 Identify and check emergency stops, guards and

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	controls. 1.5 Identify requirements for materials, quality, production and equipment checks. 1.6 Identify materials, waste management and housekeeping needs.
2. Start up powder coating process.	2.1 Determine equipment requirements. 2.2 Set up and adjust powder coating equipment, racks, overhead tracks, spray equipment, oven. 2.3 Check equipment, powder coat material and settings all match requirements. 2.4 Discard, or make adjustments to the process for, non-conforming materials. 2.5 Set up date, batch and materials markings to specifications, as required. 2.6 Complete other pre-start checks in accordance with procedures. 2.7 Start up powder coating process.
3. Operate and make adjustments as required to the powder coating process.	3.1 Start equipment safely and correctly in accordance with standard procedures. 3.2 Operate equipment, noting key variables. 3.3 Compare measures of powder build, colour and final coat match requirements. 3.4 Monitor controls including speeds, operating temperatures and spray conditions, as required. 3.5 Monitor controls/displays/terminals for production/process data. 3.6 Make adjustments to remedy faults and non-conformity to standard as required. 3.7 Maintain continuity of process. 3.8 Collect and reprocess/discard scrap/trim and other materials in accordance with procedures. 3.9 Clean, adjust and lubricate equipment as required. 3.10 Pause or stop equipment in an emergency, following procedures.
4. Anticipate and solve problems	4.1 Recognise a problem or a potential problem. 4.2 Determine problems needing priority action.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	4.3 Refer problems outside area of responsibility to appropriate person, with possible causes. 4.4 Seek information and assistance as required to solve problems. 4.5 Solve problems within area of responsibility. 4.6 Follow through items initiated until final resolution has occurred.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of organization procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job toapply and/or explain:

- coatings, materials and material characteristics
- behaviour of materials in relation to heat, pressure and time
- quality requirements at each production stage
- different types of powders
- use and purpose of pre-treatment
- suitability of powders for range of substrate materials in components
- affect of heat on powders
- function and operating principles of powder coating equipment, machine components and ancillary equipment
- safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
- the hierarchy of control including engineering controls
- impact of variations in raw materials and equipment operation in relation to final coating
- changes to materials at various stages of production
- waste management and importance of non-conforming materials
- polymer properties and their interactions with process conditions
- relationships between polymer properties and process conditions

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- changes to polymer properties to better suit process requirements.
- product problems related to polymer properties
- product problems related to process conditions
- adjustments to process conditions to meet polymer and product requirements.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect coating quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- distinguish between causes of faults.

Language, literacy and numeracy requirements

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- identify critical materials properties and powder coating process characteristics in relation to the process requirements and the end product.

Consistent performance should be demonstrated. For example, look to see that:

- production quality and output standards are met consistently
- the process runs consistently and smoothly.

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Assessment method and context

Assessment will occur on an industrial powder coating machine(s) equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all powder coating processes within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the powder coating process.

Procedures

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All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- powder coating spray equipment and ancillaries
- racks, baskets and supports, including overhead tracks and drives
- curing ovens and controls
- hand tools used in the powder coating process
- powder handling equipment
- relevant personal protective equipment.

Hazards

Typical hazards include:

- hazardous chemicals, pre-treatment chemicals and powder coating material
- humidity, air temperatures, radiant heat, hot surfaces
- stationary and moving machinery, parts and components
- temperature
- manual handling hazards
- equipment operations.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

- poor pre-treatment coverage, drainage or compatibility
- colour variation
- blemishes
- uneven coating
- over/under cured coating
- variations in materials and/or contamination of materials
- processing problems.

Fault causes

Fault causes include:

- substrate surface condition
- pre-treatment effectiveness
- spray application
- powder
- oven conditions
- incorrect quantity of materials

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- contaminated materials.

Variables

Key variables to be monitored include:

- spray application and coverage
- operating temperatures
- speed
- colour
- cycle time
- coating integrity and general conformance to specification/sample.
-

Unit Sector(s)

Not applicable.

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PMBPROD347B Produce composites using hand lamination

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the production of complex composite products using hand lamination of composite materials and the solving of problems.

Application of the Unit

Application of this unit

This competency is typically performed by operators applying knowledge of materials, product purpose and processes of hand lamination to produce products conforming to requirements. It also requires using a range of well developed skills requiring some discretion and judgement to recognise and resolve a range of problems.

The operator will:

- identify and plan own work requirements from production requests
- set up equipment, moulds and forms
- monitor materials and equipment operation
- make appropriate adjustments to correct materials, equipment or process variations
- solve equipment and process problems, seeking guidance where necessary or appropriate.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has the prerequisite of *PMBPROD247C Hand lay up composites*.

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Employability Skills Information

Employability Skills

The required outcomes described in this unit contain applicable Employability Skills. The Employability Skills Summary of the qualification(s) in which this unit is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Plan own work requirements.	1.1 Identify most appropriate equipment and materials to be used for required product and upstream and downstream operations from production plan or request. 1.2 Identify materials required, including additives. 1.3 Implement measures to control identified hazards in accordance with procedures and duty of care. 1.4 Identify requirements for materials, quality, production and equipment checks.
2. Set up mould and materials to procedures.	2.1 Check materials, resins and fibres are correct and prepared to specifications. 2.2 Inspect and prepare mould as required. 2.3 Prepare jigs, fixtures and tools as required. 2.4 Take appropriate action for non-conforming items. 2.5 Set up date, batch and materials markings to specifications, as required. 2.6 Complete other checks.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
3. Hand lay up composites to procedures.	3.1 Apply materials to the mould to specification. 3.2 Monitor product/process quality. 3.3 Make adjustments to remedy faults and non-conformity as required. 3.4 Adjust work to minimise scrap and waste.
4. Anticipate and solve problems.	4.1 Recognise a problem or a potential problem. 4.2 Determine problems needing priority action. 4.3 Refer problems outside area of responsibility to appropriate person, with possible causes. 4.4 Seek information and assistance as required to solve problems. 4.5 Solve problems within area of responsibility. 4.6 Follow through items initiated until final resolution has occurred.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults. For example, outside temperatures can affect the setting and curing time of resin mixtures. Therefore ratios of resins mixtures need to be strictly monitored to ensure an appropriate curing time for production output.

Knowledge of organisation procedures, quality requirements at each production stage, and the ability to implement them within appropriate time constraints and work standards.

Skill to identify the range of possible causes of product faults.

Application of the knowledge of managing risks using the hierarchy of controls applied to the hand lay up process. Application of approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup.

Knowledge as a basis for solving processing and material problems including:

- characteristics and properties of materials required to form a composite structure of the required strength and surface finish, including fibres and pot life of the resins used

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- impact of resin mixtures, laying of materials, and temperatures on product quality and production output
- changes to materials at various stages of production
- waste management and importance of non-conforming materials
- impact of variations in raw materials and application in relation to final product
- setting up moulds
- selection and preparation of resins, including mixing as required
- selection and preparation of fibre reinforcement, including cutting and trimming
- use of composites materials including gel coats, resins and fibres
- use and application of cores, fillers and surface finishes
- application of composite materials to the mould by hand lay up
- material properties and their interactions with process conditions
- relationships between material properties and process conditions
- changes to material properties to better suit process requirements
- product problems related to material properties
- product problems related to process conditions
- adjustments to process conditions to meet material and product requirements.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- make measurements when required and identify product out of specification
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when assistance is required to solve problems.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of reading tables of figures and graphs (and applying the resultant information), using formula percentages/ratios to determine the required mass of an additive (catalyst, pigment etc.) for a given amount of resin, and similar manipulations and interpretation.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

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A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Where the assessee does not currently possess evidence of competency in *PMBPROD247C Hand lay up composites*, it may be co-assessed with this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- identify critical materials properties and hand lamination process characteristics in relation to the process requirements and the end product
- make adjustments to the process as required
- identify and take appropriate action on problems and potential problems.

Consistent performance should be demonstrated. For example, look to see that:

- products are consistently produced which meet specification
- all safety procedures are always followed.

Assessment method and context

Assessment will occur during the hand lay up process for complex composites and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- through use of industrial hand lay up composite manufacture, using jobs of appropriate complexity
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the use of equipment and materials to form complex composite products using hand lamination processes. It includes the operation of all relevant additional equipment where that equipment is integral to the hand lay up process.

Composites may be regarded as 'complex' due to their shape (eg acute angle corners), technical specification (eg high strength/rigidity/low weight) or the conditions under which the work must be undertaken (eg poor access, hot/cold environment)

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- open moulds for composite products
- hand mixing equipment and stirrers
- knives and cutters
- hand application tools, rollers, brushes, etc
- relevant personal protective equipment.

Hazards

Typical hazards include:

- hazardous materials and vapours
- manual handling hazards
- fire hazards due to flammable nature of resins used
- knife hazards
- slip hazards.

Problems

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'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution /a solution recorded in the procedures.

Typical routine faults include:

- incorrect resin ratios
- fibre wet out
- shifting of fibres during lay up
- lay up sequence.

Non-routine faults, which may have multiple causes include:

- mould release problems,
- warping or cracking after moulding
- voids due to resin drainage.

Typical process and product problems may include:

- cracks, dents or imperfections of the mould
- use of incorrect materials
- variations in materials, colour, consistency or mix
- contamination of materials.

Appropriate action for problems outside of area of responsibility may be reporting to an appropriate person.

Appropriate action for solving problems within area of responsibility includes asking questions and seeking assistance from appropriate persons/sources.

Variables

Key variables to be monitored include:

- temperature of environment/resin
- time since mixing vs pot life of resin
- air flow/ventilation
- viscosity of resin
- differing fibres and fabrics
- compacting density of application.
-

Unit Sector(s)

Not applicable.

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PMBPROD375B Vulcanise products using an autoclave

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit applies to the application of knowledge of materials, product purpose and processes to the autoclave production of vulcanised rubber products.

Application of the Unit

Application of this unit

This competency typically applies to advanced operators who load green rubber products into an autoclave for curing/vulcanising. The key factors are ensuring compatible loads and the right curing time, temperatures and pressures. It also requires using a range of well developed skills, requiring some discretion and judgement to recognise and resolve a range of problems.

The operator will:

- identify and plan own work requirements from production requests
- load green products and remove cured products
- choose and set the right autoclave conditions
- monitor autoclave temperature and pressure profiles during the curing process
- check settings and adjustments of equipment
- make appropriate adjustments to correct materials, equipment or process variations
- solve routine and non-routine autoclave and vulcanising problems, seeking guidance where necessary or appropriate
- complete logs and reports.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

The required outcomes described in this unit contain applicable Employability Skills. The Employability Skills Summary of the qualification(s) in which this unit is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Plan own work requirements.	1.1 Identify work requirements from workplace procedures 1.2 Identify equipment and processes used for materials preparation, vulcanising and any related production process and for the downstream operations. 1.3 Identify operating principles and components of vulcanising equipment. 1.4 Identify hazards connected with materials and process from workplace reference materials including materials safety data sheets and equipment instructions. 1.5 Implement measures to control identified hazards in line with procedures and duty of care. 1.6 Identify requirements for materials, quality, production and equipment checks.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
2. Set up autoclave vulcanising process.	2.1 Identify and read equipment information, quality specifications and standard operating procedures. 2.2 Check heat and pressure settings and process adjustments for conformity to procedures. 2.3 Compare equipment and material condition to known optimum condition and take appropriate action in accordance with procedures (including, where authorised, making adjustments within overall specifications to process settings to ensure product output quality is appropriate). 2.4 Check that all gauges are operating, safety features are activated or fitted, locks and guards are in place.
3. Operate and make adjustments to the autoclave process to procedures.	3.1 Load and close autoclave and bring on line. 3.2 Monitor production outputs, equipment operating temperatures and pressures. 3.3 Make adjustments to remedy faults and non-conformity as required. 3.4 Shut down, vent and unload autoclave. 3.5 Take samples as required and identify product out of specification. 3.6 Note and report non-conformity to required workplace specifications, following workplace procedures. 3.7 Clean, adjust and lubricate equipment as required. 3.8 Pause or stop equipment in an emergency, following procedures.
4. Respond to product quality improvement requests.	4.1 Monitor vulcanising process and note conditions which may affect product quality standards. 4.2 Report process variations. 4.3 Note and implement changes in standard operating procedures and specifications.
5. Anticipate and solve problems	6.1 Recognise a problem or a potential problem 5.2 Determine problems needing priority action. 5.3 Refer problems outside area of responsibility to appropriate person, with possible causes. 5.4 Seek information and assistance as required to

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	solve problems. 5.5 Solve problems within area of responsibility. 5.6 Follow through items initiated until final resolution has occurred.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production. For example,

A knowledge of organization procedures, quality requirements at each stage of production stage and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls applied to the vulcanising process. Application of approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup.

Skill to identify the range of possible causes of product faults.

Knowledge as a basis for solving processing and material problems including:

- characteristics of materials and behaviour in relation to heat, thickness and cure rates.
- identify the function of vulcanising equipment, components and the materials used
- changes to materials at various stages of production
- relationship between steam pressure and temperatures and the effects this and time will have on product quality and production output
- impact of heat and pressure in relation to providing strength, stiffness, resistance to deformation, fatigue and abrasion
- monitor equipment operation and product quality
- impact of product section/thickness on cure requirements
- impact of compound cure system on cure requirements
- impact of heating too quickly/slowly on final product properties
- compound properties and their interactions with process conditions
- relationships between compound properties and process conditions
- changes to compound properties to better suit process requirements

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- product problems related to compound properties
- product problems related to process conditions
- adjustments to process conditions to meet compound and product requirements.

Competence also includes the ability to:

- plan own work, including predicting consequences identifying improvements
- maintain output and product quality using appropriate instruments, controls checks, test information and readings
- identify and describe own role and the roles of others involved directly in the vulcanising process
- identify when assistance is required to solve problems
- identify factors which may affect product quality and production output and appropriate remedies.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms, quality assurance records and production reports.

Basic numeracy is also required, eg to determine required steam pressure to give necessary time/temperature cycle.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- identify critical materials properties and rubber vulcanising process characteristics in relation to the process requirements and the end product
- make adjustment to the process as required.
- identify and take appropriate action on problems and potential problems.

Consistent performance should be demonstrated. For example, look to see that:

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- the process runs consistently and smoothly, with the minimum need for human intervention
- all safety procedures are always followed.

Assessment method and context

Assessment will occur on an industrial autoclave and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- on anappropriate operating plant requiring demonstration of start-up, operation and shutdown procedures
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

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This competency applies to the production of vulcanised rubber products within the rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the vulcanising autoclave process. It includes the operation of all ancillary steam equipment, but not boiler operation.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- hand carts and trolleys
- knives and other trimming equipment
- hoists/lifting equipment not requiring any special permits or licences
- basic hand tools
- relevant personal protective equipment.

Hazards

Typical hazards include:

- heat
- confined spaces
- manual handling hazards
- knife hazards.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution / a solution recorded in the procedures.

Typical process and product problems may include:

- air/water blinding of steam equipment
- faulty/unreliable gauges
- matching loads requiring the same cure conditions
- adjusting temperature/pressure profile to match load and product
- wrong cure cycle
- changed product cure systems/section
- steam problems.

Appropriate action for problems outside of area of responsibility may be reporting to an appropriate person.

Appropriate action for solving problems within area of responsibility includes asking questions and seeking assistance from appropriate persons/sources.

Variables

Key variables to be monitored include:

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- operating temperatures
- stacking and loading off product for autoclaving
- material composition
- operating pressure
- cycle time
- output rate
- product integrity and general conformance to specification and quality sample.
-

Unit Sector(s)

Not applicable.

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PMBPROD380B Produce composites using chopper gun/depositor

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers preparation and hand operation of a resin-glass depositor (chopper gun) to form a composite materials product and the solving of non-routine problems.

Application of the Unit

Application of this unit

This competency applies to advanced operators who are required to apply knowledge of materials, product purpose and processes to the hand operation of chopper guns/depositors for the production of composites. It also requires using a range of well developed skills requiring some discretion and judgement to recognise and resolve a range of problems.

The operator will:

- check settings and adjustments of equipment
- monitor equipment operation
- make appropriate adjustments to correct materials, equipment or process variations
- solve composites production equipment and process problems, seeking guidance where necessary or appropriate
- complete logs and reports.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has a prerequisite of *PMBPROD280A Operate resin-glass depositor equipment.*

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Employability Skills Information

Employability Skills

The required outcomes described in this unit contain applicable Employability Skills. The Employability Skills Summary of the qualification(s) in which this unit is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Plan own work requirements.	1.1 Identify equipment and processes to be used for production process and upstream and downstream operations from production plan or request. 1.2 Identify and check materials required including additives. 1.3 Implement measures to control identified hazards in line with procedures and duty of care. 1.4 Identify and check emergency stops, guards and controls. 1.5 Identify requirements for materials, quality, production and equipment checks. 1.6 Identify materials, waste management and housekeeping needs.
2. Set up equipment, mould and materials to procedures.	2.1 Determine equipment requirements. 2.2 Adjust controls as required for factors such as ambient conditions, temperature and materials. 2.3 Check equipment, raw material and mould all match job requirements.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	2.4 Check materials, resins, fibres, release agents are correct. 2.5 Take appropriate action for non-conforming materials. 2.6 Set up date, batch and materials markings to specifications, as required. 2.7 Complete pre-start checks.
3. Hand operate chopper gun/depositor.	3.1 Use chopper gun/depositor to apply materials to the mould to procedures. 3.2 Monitor product quality, thickness, colour and integrity. 3.3 Make adjustments to remedy faults and non-conformances as required. 3.4 Collect and segregate scrap, trim and other materials as required. 3.5 Shut off machine safely and correctly as required following procedures.
4. Anticipate and solve problems.	4.1 Recognise a problem or a potential problem.. 4.2 Determine problems needing priority action. 4.3 Refer problems outside area of responsibility to appropriate person, with possible causes. 4.4 Solve problems within area of responsibility. 4.5 Seek information and assistance as required to solve problems 4.6 Follow through items initiated until final resolution has occurred.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

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Knowledge of organization procedures, quality requirements at each stage of production and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls applied to the composites process. Application of approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup.

Show knowledge as a basis for solving processing and material problems including:

- operation of resin-glass depositor, equipment and components
- production workflow sequences and materials demand
- properties of the materials required to form a composite structure of the required strength and surface finish, including the importance of gel coat properties and bonding
- requirements for correct spraying of materials to the mould surface
- pot life of the resins used
- cleanout procedures
- impact effects of variations in raw materials and equipment operation in relation to quality of final product
- correct selection and use of equipment, materials, processes and procedures
- polymer properties and their interactions with process conditions
- relationships between polymer properties and process conditions
- changes to polymer properties to better suit process requirements.
- product problems related to polymer properties
- product problems related to process conditions
- adjustments to process conditions to meet polymer and product requirements.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- identify and describe own role and role of others involved directly in the process
- maintain output and product quality using appropriate instruments, controls, test information and readings
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the when assistance is required to solve problems.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of determining required weights/volumes of materials in a resin mix for different circumstances (say using a data sheet), number of layers of impregnated matrix required to yield the required product laminate thickness, and similar activities.

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Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Where the assessee does not currently possess evidence of competency in *PMBPROD2980A Operate resin-glass depositor equipment*, it may be co-assessed with this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- identify critical material properties and process variable in relation to the process requirements of the end product.
- make adjustments to the process as required.
- identify and take appropriate action on problems and potential problems.

Consistent performance should be demonstrated. For example, look to see that:

- composites production standards are met consistently
- all safety procedures are always followed.

Assessment method and context

Assessment will occur on chopper-gun depositor equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- using an appropriate processing plant
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

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This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the use of equipment and materials to form composite products using a chopper gun/depositor. It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- open moulds for composite products
- hand tools for mixing and application
- knives and cutters to trim fibres
- chopper gun/depositor, pots, pumps and controls
- relevant personal protective equipment.

Hazards

Typical hazards include:

- spills dusts/vapours
- slip and fall
- temperature
- hazardous substances

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- manual handling hazards
- knife hazards.
- moving equipment
- manual handling hazards.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution / a solution recorded in the procedures.

Typical routine faults such as:

- dry and/or wet laminate
- runs, sags, excessive build-up at edges of mould
- poor surface finish
- release damage
- cracks, dents or imperfections of the mould.

Non-routine faults, which may have multiple causes include:

- release problems
- distortion of product after demoulding
- warping and cracking after demoulding.

Typical process and product problems may include:

- variations in materials, colour, consistency or mix
- variations in temperature, pressures and resin-to-fibre ratios
- contamination of materials
- incorrect quantity of materials
- contaminated materials/additives
- equipment faults
- mould damage
- wrong raw materials/additives
- incorrect quantity of materials/additives
- machine failure.

Variables

Key variables to be monitored include:

- temperatures and humidity of environment
- resin to fibre ratios
- surface finish/appearance
- product integrity and general conformance to specification and quality sample.
-

Unit Sector(s)

Not applicable.

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PMBPROD430B Trial a new die/tool

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the trialing of a new die or tool. It is intended to be applied to 'high pressure' dies such as might be used for injection or blow moulding.

This competency is typically performed by technicians working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to technicians who are involved in the trialing of dies. The key factors are the monitoring of the production process and identifying routine problems.

The technician will:

- check job sheets for work to be done
- conduct pre-start checks
- start up and shut down of equipment
- monitor equipment during production process
- identify routine production problems and notify appropriate persons.

It does not apply to situations such as rotational moulding or composites (see *PMBPROD431A*).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	**PERFORMANCE CRITERIA**
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Prepare for trial to procedures.	1.1 Gather all relevant information available at the enterprise. 1.2 Confirm machine/equipment suitability. 1.3 Confirm die/tool state. 1.4 Confirm raw materials readiness.
2. Set die/tool and machine.	2.1 Fit and set up die/tool. 2.2 Set up process conditions. 2.3 Set control panel to cycle time, temperatures and heating/cooling rates as required. 2.4 Dry cycle machine and die according to procedures.
3. Trial die/tool, interpret data and adjust operation to procedures.	3.1 Carry out trial procedures in a systematic manner to meet trial objectives. 3.2 Identify and record variations from normal. 3.3 Monitor control panel and interpret test results for fluctuations, variations and trends. 3.4 Determine process limitations with respect to product and production specifications. 3.5 Adjust controls to ensure parameters are

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ELEMENT ELEMENT	**PERFORMANCE CRITERIA** Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	maintained to job specifications. 3.6 Check that process operation has improved. 3.7 Continue analysing data and making adjustments until desired level of process operation is achieved and product is within specifications. 3.8 Shut down equipment as required. 3.9 Record trial results.
4. Rectify equipment and quality problems.	4.1 Identify range of faults that will affect product and production specifications. 4.2 Determine changes required to tooling and equipment to meet product and production specifications. 4.3 Make sure appropriate records related to machinery and equipment are maintained to enterprise standards. 4.4 Identify and rectify problems that are within area of responsibility. 4.5 Report problems that are outside area of responsibility to appropriate personnel.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the materials, equipment and process sufficient to recognise and rectify potential problems. Knowledge of organization standard procedures and work instructions and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Understanding of the polymer/process interactions.

Application of the knowledge of managing risks using the hierarchy of controls applied to the process. Application of approved hazard control, safety procedures, the use of PPE in relation to handling materials, equipment operation and cleanup.

Knowledge as a basis for solving processing and material problems, including:

- product specifications and limitations

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- production equipment capability
- types and grades of materials and their limitations
- die or tool conditions and operational limitations
- use of ancillary equipment.

Language, literacy and numeracy requirements

This unit requires high levels of numeracy and literacy with the ability to interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- understand procedures and know the importance of critical material properties and quantities
- recognise potential situations requiring action and then in implementing appropriate action.

Consistent performance should be demonstrated. For example, look to see that:

- new or un-tried dies/tools are tested thoroughly
- product quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Assessment method and context

It is preferred that assessment takes place on industrial equipment in a work-like environment.

Competence in this unit may be assessed:

- on a processing plant, allowing for operation under all normal and a range of abnormal conditions

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- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the use of injection moulding, blow moulding and similar equipment. This competency applies to all plastic and rubber processes which involve a die or tool. It applies to situations such as injection or blow moulding dies. It does not apply to situations such as rotational moulding or composites (see *PMBPROD431A*).

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Die

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A former used to give the required shape to the product and which is used under pressure. Dies are typically used in the extrusion, injection, blow moulding and general rubber sectors. Dies used which are not subject to pressure are referred to as 'moulds' in this Training Package.

Simple die

A two plate die including any ejection system operating in the mould open axis, but excluding moulds with molten material retained within the mould between cycles. Products are simple, straight drawn items. Typical features may include: force, cavity, back plates, support plates, cold runner, sprue, nozzle seat, locating ring-tab, sub, fan, diaphragm and direct gating, ejector pins and sleeves, ejector plate and stripper plate, simple drilling for mould cooling.

Advanced die

A two or three plate die with one or more product forming components which move in a direction other than the mould open axis, and which are driven by the mould rather than external actuation. Excludes moulds which retain molten material within the mould between cycles. Typical features may include: sliding blocks or cores actuated by skew pins or cams; baffled, spiral, tube, and heat pipe cooling systems; rising cores; and internally actuated unscrewing systems.

Complex die

Dies which use at least one external power and control source to actuate product forming components, which move in a direction other than the mould open axis, and require sequencing with the mould operation. Includes moulds which retain molten material within the mould between cycles. Typical features may include: hot runners; insulated runners; externally actuated sliding blocks, cores, and unscrewing systems; safety interlocks.

Tools and equipment

This competency includes use of equipment and tools such as:

- hand tools as required
- relevant personal protective equipment.

Hazards

Typical hazards include:

- noise, light, energy sources
- humidity, air temperatures, radiant heat
- stationary and moving machinery, parts and components.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

- selecting the right tools for a new job
- using new and untried die or tool
- adapting the process to the new product and die/tool

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- observing the process to obtain useful trial data
- comparing the product to the desired specification
- determining the cause of non-compliances.

Distinguish between causes of faults such as:

- materials/heat
- equipment adjustment/set-up

Variables

Key variables to be monitored include:

- die/tool set up and adjustment
- machine speed, cycle rate
- temperature
- product quality measures.
-

Unit Sector(s)

Not applicable.

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PMBPROD431B Trial a new, advanced or complex mould

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the trialling of a new, advanced or complex mould. It is intended to be applied to 'low pressure' moulds as used in rotomoulding, thermoforming and composites manufacturing and not to dies such as might be used for injection or blow moulding.

This competency is typically performed by technicians working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to technicians who are involved in the trialling of moulds. The key factors are the monitoring of the production process and identifying routine problems.

The technician will:

- check job sheets for work to be done
- conduct pre-start checks
- start up and shut down equipment
- monitor equipment during production process
- identify routine production problems and notify appropriate persons

It does not apply to situations such as 'high pressure' dies or tools used in injection or blow moulding (see *PMBPROD430A*).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

The required outcomes described in this unit contain applicable Employability Skills. The Employability Skills Summary of the qualification(s) in which this unit is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Prepare for trial to procedures.	1.1 Gather all relevant information available at the enterprise. 1.2 Confirm machine/equipment suitability. 1.3 Confirm mould state. 1.4 Confirm raw materials readiness.
2. Set mould and machine.	2.1 Fit and set up mould. 2.2 Set up speed and ratios for rotation/'rock and roll'. 2.3 Set control panel to cycle time according to external temperature, humidity, type of heating used, cooling time. 2.4 Dry cycle machine and mould to procedures.
3. Trial mould, interpret data and adjust operation to procedures.	3.1 Carry out trial procedures in a systematic manner to meet trial objectives. 3.2 Identify and record variations from normal. 3.3 Monitor control panel and interpret test results for

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	fluctuations, variations and trends. 3.4 Determine process limitations with respect to product and production specifications. 3.5 Adjust controls to ensure parameters are maintained to job specifications. 3.6 Check that process operation has improved. 3.7 Continue analysing data and making adjustments until desired level of process operation is achieved and product is within specifications. 3.8 Shut down equipment as required. 3.9 Record trial results.
4. Rectify equipment and quality problems to procedures.	4.1 Identify the range of equipment and quality faults that can occur during the operation. 4.2 Determine and rectify equipment and quality fault causes. 4.3 Identify and rectify equipment failure causes. 4.4 Make sure appropriate records and log books of equipment operations are maintained. 4.5 Identify non-routine problems are and rectify within area of responsibility. 4.6 Report problems outside area of responsibility to designated person.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the materials, equipment and process sufficient to recognise and rectify potential problems. Knowledge of organization standard procedures and work instructions and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Understanding of the polymer/process interactions.

Application of the knowledge of managing risks using the hierarchy of controls applied to the process. Application of approved hazard control, safety procedures, the use of PPE in relation to handling materials, equipment operation and cleanup.

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Knowledge as a basis for solving processing and material problems, including:

- product specifications and limitations
- production equipment capability
- types and grades of materials and their limitations
- die or tool conditions and operational limitations
- use of ancillary equipment.

Language, literacy and numeracy requirements

This unit requires high levels of numeracy and literacy with the ability to interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- understand procedures and know the importance of critical material properties and quantities
- recognise potential situations requiring action and then in implementing appropriate action.

Consistent performance should be demonstrated. For example, look to see that:

- new or un-tried moulds are tested thoroughly
- product quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Assessment method and context

Assessment will occur on industrial equipment in a work-like environment.

Competence in this unit may be assessed:

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  - on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all plastic and rubber processes which involve a mould. It applies to complex composite moulds, rotomoulding and thermoforming systems,. It does not apply to situations such as injection or blow moulding dies.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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Tools and equipment

This competency includes use of equipment and tools such as:

- hand tools as required
- relevant personal protective equipment.

Equipment types may include:

- rotational moulding (eg fixed spindle, single spindle, multiple spindle, shuttle open-flame, swing, carousel, shuttle and 'rock and roll').
- complex composite moulds
- complex thermoforming moulds.

Hazards

Typical hazards include:

- noise, light, energy sources
- humidity, air temperatures, radiant heat
- stationary and moving machinery, parts and components.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

- selecting the right tools for a new job
- using new and untried moulds
- adapting the process to the new product and mould
- observing the process to obtain useful trial data
- comparing the product to the desired specification
- determining the cause of non-compliances.

Variables

Key variables to be monitored include:

- performance of mould
- temperatures
- machine speed
- materials, quantities and composition
- product quality requirements.
-

Unit Sector(s)

Not applicable.

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PMBTECH301B Use material and process knowledge to solve problems

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the application of a knowledge of polymers, their additives and their interactions with the process to the solving of problems. It may be applied in any sector of the industry. This unit covers polymer properties and their application in general to processes. The application in specific processes is covered in the specific process units.

This competency is typically performed by advanced operators working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to advanced operators who recognise potential process problems and analyse process problems using their knowledge and understanding of the polymer materials they are processing. The problems are broader and/or require more knowledge of the properties of polymers than those which apply to a single work station and which may be an element of a 'PROD' competency.

It includes:

- a basic knowledge of different polymer materials
- a basic knowledge of the applications of different polymers
- a basic knowledge of the different properties of polymers
- an understanding of the relationship between process conditions and polymer properties.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

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This unit of competency has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Identify and apply applications of polymer materials.	1.1 Identify typical applications for common polymer materials. 1.2 Recognise physical properties of common polymers. 1.3 Use additives with knowledge of the effects of using the incorrect amount/type of additive. 1.4 Handle additives to minimise the associated.
2. Identify and apply impacts of impurities on polymer products.	2.1 Identify major impurities of concern to product and process. 2.2 Examine polymer materials for impurities. 2.3 Apply corrective actions to remove/compensate for impurities.
3. Determine expected material properties from polymer type and grade.	3.1 Identify the relationship between polymer type and polymer characteristics. 3.2 Identify the relationship between polymer grade and degree of polymerisation.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	3.3 Identify the influence of polymer structure on properties.
4. Solve process problems related to polymer flow characteristics.	4.1 Use polymer flow test methods and recognise the importance of flow properties to the process. 4.2 Control critical factors leading to changes of state of the polymer during processing using knowledge of the causes. 4.3 Identify the relationship between polymer flow and other polymer properties. 4.4 Recognise process/product signs of incorrect polymer flow characteristics. 4.5 Recommend corrective actions for problems caused by polymer flow.
5. Solve process/product problems related to heating and cooling of product/ material in process.	5.1 Recognise the importance of the degree of cross linking on product properties if appropriate. 5.2 Recognise the importance of the degree of crystallisation/ crystal size on product properties if appropriate. 5.3 Recognise the impact of shrinkage on product properties if appropriate. 5.4 Recognise the impact of annealing on product properties if appropriate. 5.5 Recognise process/product signs of incorrect heating/ cooling. 5.6 Recommend corrective actions for problems caused by heating.
6. Solve process problems related to polymer faults	6.1 Recognise an actual or a potential process problem. 6.2 Analyse that problem in a formal manner. 6.3 Determine appropriate corrective action. 6.4 Implement that corrective action if it is within the range of workplace authority. 6.5 Make recommendations for corrective action outside range of workplace authority. 6.6 Follow through on corrective action and make sure problem is resolved.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge of polymers and how their properties vary and the relevance to these properties to processing and product. Descriptions of polymer molecular shape and arrangement should be limited to commonly accepted diagrammatic representations of these structures. Knowledge of organization procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Knowledge as a basis for solving processing and material problems including:

- type of polymer and polymer structure
- impact of additives
- the importance of flow and flow properties
- the impact of temperature and heating/cooling rate on processing and properties

Competence also includes the ability to distinguish between the causes of faults such as:

- wrong raw materials/additives or wrong grade
- incorrect quantity of materials/additives
- contaminated materials/additives
- out of specification materials
- process set-up and/or operation.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret technical specifications and similar information.

Writing may be required to the level of completing workplace forms.

Numeracy is required to the level of understanding the significance of numbers and being able to interpret numerical data.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

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Where the assessee does not currently possess evidence of competency in *PMBPROD235B Use materials and process knowledge to complete work operations*, it may be co-assessed with this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to apply a theoretical understanding of polymers to workplace problems.

Assessment method and context

Assessment will occur using industrial polymers and work-like scenarios.

Competence in this unit may be assessed:

- using appropriate, industrial scenarios and problems
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and solve problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

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Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant equipment.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Polymer properties

Polymer properties related to flow include:

- molecular weight
- molecular structure
- factors effecting viscosity.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Unit Sector(s)

Not applicable.

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PMBTECH302A Modify existing compounds

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the development of trial compounds in a laboratory or using pilot equipment and then monitoring initial factory trials. This competency would typically be done by a operator either working alone for a minor modification or with other relevant person(s) for a major modification.

This competency covers minor modifications to existing compounds/formulae to develop an updated version of an existing compound or a 'new' compound which is strongly based on an existing compound.

Application of the Unit

Application of this unit

This competency applies to operators who are required to modify the formulae for compounds and demonstrate that an appropriate formula has been developed.

It includes:

- determining the starting formula
- mixing the compound
- interpreting the test results
- modifying the formula
- verifying/modifying the compound during initial factory trials.

PMLTEST307B Prepare trial batches for evaluation may be used where the competency simply requires mixing in the laboratory and *PMLTEST300B Perform basic tests* (or other suitable test unit) may be used for the testing competency.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.
1. Confirm requirements of modified formula.	1.1 Check that specifications for new compound are complete and unambiguous. 1.2 Clarify items which are unclear or beyond the normal scope of work. 1.3 Investigate the type of changes/materials which are likely to meet these requirements. 1.4 Clarify any possible issues if different, unusual or

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	exotic materials are likely to be required. 1.5 Identify tests required on trial compound.
2. Estimate starting formula.	2.1 Identify existing compound(s) with similar specifications. 2.2 Estimate required changes to existing compound. 2.3 Check practicality of proposed changes. 2.4 Check HSE impacts of proposed changes. 2.5 Modify proposed starting formulae as appropriate.
3. Prepare trial compounds.	3.1 Identify and control all hazards for pilot mixing. 3.2 Identify and check all required plant and equipment. 3.3 Obtain and prepare all required materials. 3.4 Mix trial compound and obtain sample(s). 3.5 Interpret test results. 3.6 Modify formula and repeat trials as required.
4. Check initial factory trial.	4.1 Check availability of required resources and plant availability. 4.2 Ensure all authorities and permissions have been obtained. 4.3 Check all hazard controls have been implemented. 4.4 Monitor factory trial mixing of compound. 4.5 Obtain sample(s) and interpret test results. 4.6 Modify formula and repeat factory trial as required.
5. Complete trial.	5.1 Complete all required records and reports. 5.2 Check any changes to resources and procedures have been incorporated into standard procedures. 5.3 Ensure any additional HSE or skill requirements have been included in future plans.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Competence in this unit requires knowledge of:

- the components of relevant compounds and their impact on compound properties

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- tests which might be used and the applicability of the different tests for different compound properties
- mixing methods and the impacts of different mixing on compound properties
- existing compounds and their properties
- requirements for factory trialling and scaling up from laboratory/pilot scale
- suppliers of materials
- sources of information about materials.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret technical specifications and literature and to communicate with all relevant stakeholders.

Writing formulae/mixing instructions and similar documents.

Numeracy is required to interpret technical specifications and test results and to calculate quantities and proportions required for the formula, make adjustments and then to scale up to factory trials.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- clarify the requirements of the modified compound
- make an initial estimated formula and justify that initial formula
- modify the formula based on test data and justify the modifications
- make final adjustments for the scaled up formula to work successfully in the factory.

Consistent performance should be demonstrated through the evidence from several formula modifications requiring different types of changes.

Context of assessment

This unit may be best assessed either through a portfolio of compounds developed/ modified, or the use of projects to develop/modify a range of existing compounds.

Competence in this unit may be assessed:

- on the plant

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  - using questions to assess knowledge
  - in a laboratory/pilot plant
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

Method of assessment

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to advanced operators who modify formulae for compounds used in the factory. They will typically be based in a laboratory or similar pilot/product/ material development area but will also have responsibility in the factory for monitoring new batches and ensuring that modified compounds are suitable when released for standard production.

A operator working at this level would typically be responsible to a more senior operator and would work closely with them on new compounds and major modifications of existing compounds.

The operator would not be expected to develop a new compound or make a major modification to an existing compound unless under the direction of a more senior operator.

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Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Health, **Safety and Environment**

All operations are subject to stringent health, safety and environment requirements, which may be imposed through State or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the operator needs to ensure the HSE requirements take precedence.

Compound

Compound is used to mean any mixture of materials which is undertaken to a set formula and in specified proportions.

Tests

Tests includes the normal range of physical, chemical and environmental (weathering) tests which might be applied to the product

Unit Sector(s)

Not applicable.

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PMBTECH303A Make minor modifications to products

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the minor modification of products in a laboratory or using pilot equipment and then monitoring initial factory trials. This competency would typically be done by an advanced operator either working alone for a minor modification or with other relevant person(s) for a major modification or a new product.

This competency covers minor modifications to existing products to develop an updated version of an existing product or a 'new' product which is strongly based on an existing product. Processes may also need to be modified, but again this modification of process will be minor and based on established practice.

A minor modification will be based on an existing product and will produce a modified product of similar specification. Changes may include things like small changes to sizes, shapes, surface finish. Changes may include minor modification to tooling but will not normally include new or significantly redesigned tooling.

Application of the Unit

Application of this unit

This competency applies to operators who are required to modify products and demonstrate that an appropriate product and manufacturing process has been developed.

It includes:

- confirming the product specification
- making trial or prototype products
- interpreting the test results
- modifying the product design
- verifying/modifying the product and manufacturing process during initial factory trials.

Note that while this unit of competency requires initial factory trials of the modified product, some laboratory (or similar) testing of the product will also be required. This is not part of this unit as the testing may be performed by another person.

PMLTEST300B Perform basic tests (or other suitable test unit) may be used for the testing competency if required.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Confirm requirements of modified/new product.	1.1 Check that specifications for new product are complete and unambiguous. 1.2 Clarify items which are unclear or beyond the normal scope of work. 1.3 Investigate the type of changes/modifications which are likely to meet these requirements. 1.4 Clarify any possible issues if processes, plant,

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	equipment or tooling outside the plant's normal range are likely to be required. 1.5 Identify tests required on trial product.
2. Identify similar existing product(s).	2.1 Identify existing product(s) with similar specifications. 2.2 Estimate required changes to existing product(s). 2.3 Check practicality of proposed changes. 2.4 Check HSE impacts of proposed changes. 2.5 Draft initial product design and manufacturing process.
3. Prepare trial products.	3.1 Identify and control all hazards for pilot/trial production. 3.2 Identify and check all required plant and equipment. 3.3 Obtain and prepare all required materials and tooling. 3.4 Make trial product and obtain sample(s). 3.5 Interpret test results. 3.6 Modify product design/manufacturing process and repeat trials as required.
4. Check initial factory trial.	4.1 Check availability of required resources and plant availability. 4.2 Ensure all authorities and permissions have been obtained. 4.3 Check all hazard controls have been implemented. 4.4 Monitor factory trial manufacture of product. 4.5 Obtain sample(s) and interpret test results. 4.6 Modify product design/manufacturing process and repeat factory trial as required.
5. Complete trial	5.1 Complete all required records and reports. 5.2 Check any changes to resources and procedures have been incorporated into standard procedures. 5.3 Ensure any additional HSE or skill requirements have been included in future plans.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Competence in this unit requires knowledge of:

- product features and their impact on product properties
- tests which might be used and the applicability of the different tests for different product properties
- relevant manufacturing methods and the impacts of different methods/processes on product properties
- relevant existing products and their properties
- requirements for factory trialling and scaling up from laboratory/pilot scale
- suppliers of materials and tooling
- sources of information about materials and tooling.

Language, literacy and numeracy requirements

This unit requires the ability to read and interpret technical specifications and literature and to communicate with all relevant stakeholders.

Writing product design specifications, processing instructions and similar documents.

Numeracy is required to interpret technical specifications and test results and to calculate quantities and proportions required for the specification, make adjustments and then to scale up to factory trials.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit may be best assessed either through a portfolio of products developed/ modified, or the use of projects to develop/modify a range of existing products.

Critical aspects

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- clarify the requirements of the modified product
- make an initial design and process and justify that initial design and process
- modify the design/process based on test data and justify the modifications
- make final adjustments for the scaled up product to work successfully in the factory

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Consistent performance should be demonstrated through the evidence from several formula modifications requiring different types of changes.

Context of assessment

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. A holistic approach should be taken to the assessment.

Competence in this unit may be assessed:

- on the plant
- using questions to assess knowledge
- in a laboratory/pilot plant
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

Method of assessment

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

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This competency applies to advanced operators who modify products. They will typically be based in a laboratory or similar pilot/product development area but will also have responsibility in the factory for monitoring new products and ensuring that modified products are suitable when released for standard production.

An operator working at this level would typically be responsible to a more senior operator and would work closely with them on new products and major modifications of existing products.

The operator would not be expected to develop a new product or make a major modification to an existing product unless under the direction of a more senior operator.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Health, **Safety and Environment** (**HSE**)

All operations are subject to stringent health, safety and environment requirements, which may be imposed through State or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the operator needs to ensure the HSE requirements take precedence.

Tests

Tests includes the normal range of physical, chemical and environmental (weathering) tests which might be applied to the product.

Trial product

The trial product may be full sized, or a scale version. Trial production will typically be 'one off' or small run compared to final production which will occur in normal run sizes under normal conditions.

Unit Sector(s)

Not applicable.

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PMBTECH401B Predict polymer properties and characteristics

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the ability to apply a knowledge of polymer morphology, the properties of polymers in relation to their morphology, physical failure in polymers and test methods for polymeric materials to predict polymer properties and processing characteristics. It applies to all sectors of the industry.

This competency is typically performed by technicians working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to technicians who use an understanding of polymer morphology to explain polymer properties in terms of phase diagrams, to predict polymer properties, and to organise and interpret tests on polymers.

It includes:

- polymer phase change such as glass transition
- property changes due to processing conditions
- physical failure causes
- test method principles
- the relationship of test results to polymer properties and uses.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has a prerequisite of *PMB TECH 301A Use material and process knowledge to solve problems*.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Predict the impact of processing conditions on polymer properties.	1.1 Predict property changes due to molecular weight and temperature. 1.2 Identify the glass transition temperature and melting point relative to ambient temperature. 1.3 Describe the morphological changes occurring to polymers as the temperature is raised to typical moulding conditions. 1.4 Describe the effect of cooling rate on polymer morphology. 1.5 Predict potential product dimension/shape changes due to internal stresses resulting from molecular orientation. 1.6 Determine the affect of post-mould annealing on the degree of crystallisation and crystal.
2. Predict physical properties of polymers from their morphology.	2.1 Predict the effects on physical properties of: • temperature • crystal size

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	• degree of crystallisation • molecular orientation 2.2 Predict shrinkage from morphology.
3. Determine likely physical failures of polymers.	3.1 Determine impact of physical use conditions on physical failure. 3.2 Determine impact of polymer characteristics on physical failure.
4. Organise and interpret polymer tests.	4.1 Describe melt flow properties from flow data. 4.2 Choose appropriate test type to measure desired criteria. 4.3 Specify relevant standard test method. 4.4 Interpret test result, making allowance for possible variations in test.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the morphology of polymers sufficient to predict common physical properties and behaviours and to interpret test results, allowing for normal variations in data. Knowledge of organization standard procedures and work instructions, relevant regulatory requirements and standard international and national test methods, along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Knowledge as a basis for solving processing and material problems including:

- polymer morphology using phase diagrams
- properties of polymers in relation to their morphology
- physical failure in polymers
- polymer materials test methods and property data
- changes in properties and variations in test data
- changes in physical properties due to compounding, processing or environmental conditions

Language, **literacy and numeracy requirements**

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This unit requires the ability to read and interpret technical literature and standard test methods. High level numeracy is also required, particularly graphical interpretation skills and data interpretation

Numeracyis required to be able to determine sizes, angles and shapes.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that the morphology be understood and that the importance of critical material properties and quantities is known. Competence must be demonstrated in the ability to interpret polymer properties from their morphology.

Consistent performance should be demonstrated. For example, look to see that:

- test procedures are understood
- correct tests and methods are specified
- test results are interpreted appropriately
- polymer properties are described
- changes in properties are adequately explained.

Assessment method and context

Assessment will occur using appropriate industrial polymers and scenarios and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- using an appropriate, industrial polymers and properties/characteristics relevant to the process/product
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

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Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the use of phase diagrams. It does not include chemical form and structure of polymer molecules beyond a basic knowledge. It may be applied to plastics only, rubber only, thermosetting resins only or all of these.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It requires an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Unit Sector(s)

Not applicable.

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PMBTECH402B Set advanced or complex dies

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the ability to set advanced or complex dies, verify machine, die, and ancillary equipment functions and remove advanced or complex injection dies.

This competency is typically performed by technicians working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to technicians typically in the injection moulding and blow moulding sectors who set complex dies and make sure they are ready for production.

The key factors are the efficient setting and validation of the right die for the job and the tuning of this die for efficient production. It includes:

- understanding die/process/material/product interactions
- selecting the right die and equipment such as actuated cores, power and control units
- checking the die for wear and damage
- setting and adjusting the replacement die according to specifications
- checking the die and process for efficient operation and making appropriate adjustments

PMBPREP304C Set a die covers the die setting for simple dies.

This unit does NOT include making adjustments, repairs or modifications to dies or equipment which require trade level skills such as might be made by a mechanical, tradesperson or toolmaker or similar skilled metals tradesperson.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites

This unit has the prerequisite of *PMBPREP304C Set a die*.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Prepare to change advanced or complex die.	1.1 Determine when changeover will be required, and plan requirements for die change. 1.2 Prepare dies and all equipment related to the advanced or complex die change. 1.3 Prepare the moulding machine for die removal according to enterprise procedures.
2. Change dies.	2.1 Remove die according to enterprise procedures, in a safe, systematic and time efficient manner. 2.2 Clean and store die according to workplace procedures applying corrosion protection if required. 2.3 Prepare the moulding machine according to procedures.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	2.4 Attach replacement die to the machine according to procedures.
3. Set advanced or complex die.	3.1 Set machine conditions for new die. 3.2 Restart machine as per procedure. 3.3 Dry cycle machine and die according to enterprise procedures. 3.4 Check operation of die and power and control devices against die set up specifications. 3.5 Check the first off sample for compliance with required standards. 3.6 Fine tune settings and other production variables as required. 3.7 Note any equipment variances between actual production and documented set up conditions. 3.8 Complete workplace documentation and report to appropriate personnel.
4. Anticipate die setting problems.	4.1 Identify potential problems which may occur during the die changing and setting process. 4.2 Determine possible causes of these problems. 4.3 Identify most likely causes and prioritise appropriate actions. 4.4 Rectify problems using appropriate solutions within area of responsibility. 4.5 Recommend improvements in systems or procedures.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of advanced and complex dies and their interactions with the process, materials and products is required.

Knowledge of organization standard procedures and work instructions and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

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Knowledge about advanced/complex dies and their features which makes them more complex for setting than simple dies. This may include knowledge of:

- sliding blocks or cores actuated by skew pins or cams
- baffled, spiral, tube, and heat pipe cooling systems
- rising cores
- internally actuated unscrewing systems
- external power and control sources,
- externally actuated sliding blocks, cores, and unscrewing systems
- safety interlocks.

Skills in the safe, precise, efficient and correct installation of advanced and complex dies.

Competence includes the ability to apply and/or explain to a level sufficient for the practical completion of the job:

- die setting procedures for advanced/complex dies
- verification procedures for advanced/complex dies.

Competence also includes the ability to distinguish between causes of faults such as:

- wrong dies
- wrongly set die
- worn or damaged die
- non-optimum process conditions
- material type or quality.

Language, literacy and numeracy requirements

This unit requires the ability to read and interpret technical specifications and data.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that the procedures and the importance of critical die characteristics be understood. Competence must be demonstrated in the ability to recognise potential situations requiring action and then in implementing appropriate action.

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Consistent performance should be demonstrated. For example, look to see that at least one type of advanced or complex die has been correctly set and removed and that there is evidence that other types of advanced or complex dies can also be set/removed.

Assessment method and context

Assessment will occur on equipment using complex dies and will be undertaken in a work-like environment.

Competence in this unit may be assessed using an appropriate, industrial moulding machine:

- requiring demonstration of start-up, operation and emergency stop procedures
- requiring demonstration of changing and setting procedure for an advanced or complex die
- in a situation allowing the generation of evidence of the ability to recognise and resolve problems
- using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

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This competency unit includes the setting and removal of advanced or complex dies. It does not include simple dies or moulds.

This competency applies typically to the injection moulding and blow moulding sectors. It requires an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Die

A die is a former used to give shape to the product and used under pressure. Dies are typically used in the extrusion, injection, blow moulding and general rubber sectors. Dies which are not subject to pressure are referred to as 'moulds' in this Training Package.

Advanced dies

Advanced dies are two or three plate dies with one or more product forming components which move in a direction other than the mould open axis, and which are driven by the mould rather than external actuation. Typical features may include:

- sliding blocks or cores actuated by skew pins or cams
- baffled, spiral, tube, and heat pipe cooling systems
- rising cores
- internally actuated unscrewing systems.

Complex dies

Complex dies are dies which:

- use at least one external power and control source to actuate product forming components
- move in a direction other than the mould open axis
- require sequencing with the mould operation.

They include moulds which retain polymer melt within the mould between cycles.

Typical features may include:

- hot runners
- insulated runners
- externally actuated sliding blocks, cores and unscrewing systems
- safety interlocks.

Setting

Setting of the machine conditions may include setting the mould height on the machine, the clamp force, the mould safety system, the ejector system, the mould opening and closing distances, speeds and forces and the injection unit.

These settings may be performed automatically, using an electronic storage device to load settings from a previous run of this product, or may be performed by manually setting controls individually.

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Die and machine preparation

The die and machine preparation may include making connections such as:

- hydraulic
- pneumatic
- electrical.

Die fitting

Die fitting includes the placement, attachment and adjustment of dies against predetermined specifications, but does not include the modification of dies or equipment to make them fit against new specifications or to change their performance as might be done by a toolmaker or similar metals tradesperson. Repairs to dies are also not covered by this unit.

Die operations

Die operations may include:

- die temperature control
- die component stroke
- clamping force
- speed
- pressure
- sequencing
- interlocks

Machine operations

Machine operations may include:

- machine movement speed and stroke
- pressure
- sequencing
- interlocks.

Ancillary equipment operations

Ancillary equipment operations may include:

- hot-runner temperature control
- hydraulic or pneumatic power supply for actuation of equipment such as cores or sliding blocks
- mould temperature control.

Tools and equipment

This competency includes use of equipment and tools such as:

- hand carts and trolleys
- hoists/lifting equipment not requiring any special permits or licences
- basic hand tools
- relevant personal protective equipment.

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Hazards

Typical hazards include:

- hazardous materials
- manual handling hazards
- hot surfaces.

Anticipate problems

'Anticipate problems' includes taking a proactive approach to a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures, and endeavouring to learn from the problem so that it does not recur.

Typical die setting problems may include:

- lack of cleaning of die surface and cooling channels, leading to corrosion
- inadequate fitting of the dies to the platens, causing poor alignment or movement during production
- fine adjustments of die movements, to optimise production.

All operations are performed in accordance with procedures.

Variables

Key variables, and their causes, to be monitored include:

- time/effort required to set a die
- number of attempts to produce a first off within specification
- the need to reset/adjust a die during then production run.
-

Unit Sector(s)

Not applicable.

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PMBTECH403B Test fibre-composites materials and laminates

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the knowledge and skill applied in testing fibre reinforced plastics materials and laminates for conformance with design and product quality specification.

Application of the Unit

Application of this unit

This competency applies to technicians who will determine test specifications and carry out a variety of tests on fibre-composite materials and products according to industry codes of practice and AS/NZ standards. This competency is typically performed by technicians working either independently or as part of a work team.

It includes:

- raw material applications (eg resin viscosity, specific gravity of resins and gelcoats, gel time, resin exotherm, monomer content, heat deflection temperature, styrene emission, resin colour, gelcoat water resistance)
- laminate applications (eg Barcol hardness, tensile strength and elongation, compressive strength, flexural strength and flexural modulus, impact strength, glass content, water absorption, product weathering capabilities, dielectric strength, flammability, acid and alkali resistance, thickness testing)
- test applications (eg comparing use of common resins and reinforcements in laminates, comparing the tensile strength of given laminates with metals, comparing test failure modes of laminate samples with metals).
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

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This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Determine test requirements.	1.1 Identify properties to be measured according to specification. 1.2 Select appropriate test methods according to specifications. 1.3 Select appropriate testing equipment according to standards and specifications.
2. Perform raw material tests.	2.1 Prepare samples according to specification. 2.2 Perform tests in accordance with job specifications. 2.3 Record test results according to standard procedures. 2.4 Interpret test results and compare with manufacturer material data sheets.
3. Perform moulded product tests.	3.1 Prepare samples according to specification. 3.2 Perform tests in accordance with job specifications.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	3.3 Record test results according to standard procedures. 3.4 Interpret test result and compare against quality specification.
4. Record and report test results.	4.1 Document tests to enterprise requirements. 4.2 Compare results against standards. 4.3 Make written recommendations (eg process control actions, raw material suitability, product acceptance).

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the materials, equipment and process sufficient to predict their interactions and their impacts on performance. (For example, as resin is heated, its viscosity reduces. If viscosity is too low, there is a risk that the mould will fill before the fibre is fully impregnated; if too high, the reinforcement will have a tendency to distort.)

Knowledge of organization procedures and policies, quality requirements at each production stage and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.(eg manufacturing design requirements, enterprise requirements for testing documentation).

Knowledge as a basis for solving process and material problems:

- types of tests, their purposes and functions
- product or material test performance indices within standard variation, and standard response procedures
- safe test procedures
- role of testing in quality control and quality assurance procedures
- interpreting manufacturer material data sheets
- interpreting variances from specifications
- safety factors;
- effects on laminate design
- relevance of failure mode to FRP laminate design
- effect of creep and fatigue on laminates
- relationship of laminate thickness to bonding and material properties

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- span and deflection.

Language, literacy and numeracy requirements

This unit requires the ability to interpret technical specifications and standard laboratory procedures.

It also requires report writing, including graphical representations of results

Numeracy is required to perform required calculations and interpret results.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- select and apply the appropriate test methods for the job, and correctly interpret the test results
- identify and take appropriate action on problems and potential problems.

Consistent performance should be demonstrated. For example, look to see that:

- tests are performed to procedures at all times
- all safety procedures are always followed.

Assessment method and context

Assessment will occur on appropriate fibre composite testing equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- by direct observation using appropriate testing equipment
- in a situation allowing for the generation of evidence of the ability to respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

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In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

Additional resources might include sets of specifications from which test requirements might be determined and a range of samples of materials/products from which test samples might be prepared and then tests conducted.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to the testing of raw materials and moulded laminates, using a range of standard testing equipment and test methods within the plastics industry.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This unit of competency includes use of equipment and tools such as:

- testing equipment such as gel timer, flow meter, tensile tester, hardness tester, mold flow indexer, flammability/smoke tester, flexular tester etc.)
- materials handling equipment
- relevant PPE
- equipment as specified by AS/NZ standards (where applicable).

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Unit Sector(s)

Not applicable.

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PMBTECH404B Mould chemical resistant and/or fire retardant fibre-composites

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers moulding of fibre-composites for chemical resistant and/or fire retardant applications and the solving of complex, non-routine problems.

Application of the Unit

Application of this unit

This competency is typically performed by technicians applying knowledge of materials, product purpose and processes to laminate and lay-up special-purpose chemical-resistant/fire retardant composite products. It also requires using a broad knowledge base incorporating some theoretical concepts to recognise and resolve a range of problems.

The technician will:

- select materials and processes to meet product requirements
- check product for quality and conformity to specifications
- make adjustments to remedy faults and nonconformity, as required
- solve equipment, material and process problems, seeking assistance where necessary or appropriate.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has the prerequisite of:

- *PMBPROD347A* Produce *composites using hand lamination* **OR**
- *PMBPROD380A Produce composites using chopper gun*/*depositors*.

NOTE that *PMAPER200A Work in accordance* with an issued permit may also be needed in some circumstances.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Confirm product specifications.	1.1 Confirm the conditions of use of the desired composite product. 1.2 Confirm the required specification of the desired composite product. 1.3 Determine any other special requirements of the desired composite product. 1.4 Obtain client signoff of specification/ requirements.
2. Select appropriate materials/process to produce the desired composite product.	2.1 Identify the laminate properties suitable for the job. 2.2 Select the appropriate resin, matrix and other materials. 2.3 Select the process to be used to make product. 2.4 Implement measures to control identified hazards in line with procedures and duty of care. 2.5 Make trial samples where required and test or arrange testing of samples as required.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	2.6 Check suitability of combination of materials and process to meet all end use requirements, 2.7 Complete pre-start checks.
3. Lay up or mould the laminate.	3.1 Prepare and apply mould release to the mould surface if required. 3.2 Clean and prepare structure surface for adhesion if required. 3.3 Apply laminate materials to the mould or to the structure as required. 3.4 Inspect/test the laminate surface as required. 3.5 Make adjustments to remedy faults and nonconformity as required. 3.6 Adjust process to minimise scrap and waste. 3.7 Clean, adjust and lubricate equipment as required.
4. Anticipate and solve problems.	4.1 Recognise a problem or a potential problem. 4.2 Determine problems needing priority action. 4.3 Determine possible fault causes. 4.4 Solve problems within area of responsibility. 4.5 Refer problems outside area of responsibility to designated person, with .possible causes. 4.6 Follow through items initiated until final resolution has occurred.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge and ability to implement organization procedures, quality requirements at each production stage and relevant regulatory requirements, within appropriate time constraints and work standards.

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Application of the knowledge of managing risks using the hierarchy of controls applied to the lamination or lay-up processes. Application of approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment, operation and cleanup.

Knowledge as a basis for solving process and material problems:

- characteristics of materials and behaviour in relation to heat, pressure, flow rate and time
- construction of chemical resistant laminates, techniques and equipment used
- techniques and equipment used for fire retardant laminates
- techniques and equipment used for wet-area applications
- applications (eg marine, aerospace, commercial)
- changes to materials at various stages of production
- impact of variations in raw materials and equipment operation in relation to final product
- waste management and importance of non-conforming materials.

Skills to identify and take appropriate action on the range of possible causes of product faults.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- maintain output and product quality using appropriate instruments, controls, test information and readings
- identify and describe won role and role of others involved directly in the process
- identify when assistance is required to solve problems.

Language, literacy and numeracy requirements

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to technicians.

Writing is required to the level of completing workplace forms.

Numeracy is required, eg to determine quantities required and to interpret corrosion resistance and fire retardance data/tables.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

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It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- select and apply the appropriate laminate to meet the cost and performance specification for the particular job
- identify critical materials properties and process variables in relation to the process requirements and the end product
- make adjustments to the process as required
- identify and take appropriate action on problems and potential problems.

Consistent performance should be demonstrated. For example, look to see that:

- the process runs consistently and smoothly, with minimum need for intervention
- all safety procedures are always followed.

Assessment method and context

Assessment will occur on special purpose chemical resistant/fire retardant lamination method and equipment and will be undertaken in a work-like environment

Competence in this unit may be assessed:

- over a range of actual special purpose lamination methods which are undertaken in the workplace
- in a situation allowing the for generation of evidence of the ability to recognise, anticipate and solve problems
- using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

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Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This unit covers the making of a resistant/retardant laminate in a factory environment on a mould, or the laying up of a composite surface on a substrate such as a tank surface.

This unit covers both the selection of the appropriate resin, matrix and process from the standard systems available from the technician's enterprise, and the making of the resistant/ retardant product. It does not extend to the developing of totally new products using new resin/matrix systems for new (to the enterprise) end use environments. PMB TECH 505 or TECH 601 are more appropriate units in these circumstances.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include:

- waterproofing
- alkali and acid resistance
- heat resistance
- fire retardancy
- smoke generation
- abrasion resistance
- AS/NZ standards as applicable
- cold weather performance and curing.

Tools and equipment

This competency includes use of equipment and tools such as:

- moulds
- hand mixing tools such as stirrers
- knives and cutters to trim fibres
- hand application tools such as rollers, trowels, brushes etc.
- relevant personal protective equipment.

Hazards

Typical hazards include:

- temperature
- hazardous materials

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- manual handling hazards
- equipment operations
- working at heights
- working in confined spaces.

Problems

'Anticipate and solve problems' means resolve a range of complex, non-routine problems using process and product knowledge to develop solutions to problems which do not have a known solution/s recorded in the procedures.

Typical process and product problems may include:

- cracks, dents or imperfections of the mould/substrate
- variations in materials, colour, consistency or mix
- adjustment and settings of the applicator (where used)
- application of the materials to the mould/substrate as required
- contamination of materials
- equipment malfunctions
- pin holes or other imperfections leading to barrier problems.

Appropriate action for problems outside of area of responsibility may be reporting to an appropriate person.

Appropriate action for solving problems within area of responsibility includes asking questions and seeking assistance from appropriate persons/sources.

Variables

Key variables to be monitored include:

- surface finish
- colour
- thickness
- product integrity and general conformance to specifications.
-

Unit Sector(s)

Not applicable.

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PMBTECH405B Repair damaged fibre-composites structures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the repair of damaged fibre-composites products.

This competency is typically performed by technicians working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to operators who identify, diagnose, and make repairs to products with in-service damage which may be cosmetic or structural damage.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has the prerequisite of *PMBPROD247B Hand lay up composites*.

Achievement of competency in *PMAPER200A Work in accordance with an issued permit* may also be required in some workplaces for safety or other reasons before competency is achieved in this unit

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Assess the product and damage.	1.1 Determine scope of repair required, such as either to original manufacturer specifications or other needs. 1.2 Select appropriate repair technique. 1.3 Consult testing reports giving recommended areas to be repaired and extent of damage if available.
2. Make repairs.	2.1 Examine the accessibility of the damaged section(s). 2.2 Identify cosmetic repair areas and structural repair areas. 2.3 Consult original manufacturer's manual or structural repairs manual where available. 2.4 Consult product release documentation, and insurance company requirements if available. 2.5 Prepare and clean up the product prior to commencing the actual repair. 2.6 Make partial mould or prepare insert moulding as required for the type of repair. 2.7 Expose bonding surfaces, and/or structural anchor points, using tapered sanding techniques as determined. 2.8 Rebuild the damaged area and finish surfaces to required standard. 2.9 Take samples for testing and inclusion with documentation as required.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
3. Document the repair.	3.1 Raise repair documentation for costing, legal and insurance requirements as required. 3.2 Complete other documentation and records required.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge of organization procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job and to apply and explain:

- damage assessment: both sides accessible; one side only accessible; cosmetic damage; structural damage; planning, costing and organizing job repair
- repair techniques: surface and part preparation; laminating, reinforcing and strengthening techniques; filling and joining techniques; surface preparation for paint, gelcoat, flowcoat and detailing for customer delivery
- rectification procedures for repair of marine, automotive, aerospace, industrial, architectural and other FRP mouldings
- use of manufacturer supplied, structural repair manuals, where available
- release documentation, legal and insurance procedures for FRP
- product repairs.

Language, **literacy and numeracy requirements**

This unit requires the ability to read and interpret typical manufacturer manuals, insurance documentation, technical specifications, product specifications, job sheets, procedures, material labels and safety information as provided to technicians.

Writing is required to the level of completing workplace forms.

Numeracy is required, eg to determine quantities required, interpret technical specifications and undertake costings.

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Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Where the assessee does not currently possess evidence of competency in *PMBPROD247B Hand lay up composites*, it may be co-assessed with this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability to assess the damage and apply the appropriate repair method for the job.

Assessment method and context

Assessment will occur using industrial scenarios and composites and equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- using appropriate, industrial composites
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and solve problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

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Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to technicians who need to assess and make structural and cosmetic repairs to composite products.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- hoists/lifting equipment not requiring any special permits or licenses
- plastic or other filling compounds
- basic hand tools required for repair of products
- relevant personal protective equipment.

Hazards

Typical hazards include:

- spills
- dusts/vapours
- hazardous materials
- manual handling hazards.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures

Typical process and product problems may include:

- inappropriate materials being selected and used
- equipment failures
- effect of weather on curing time and surface finish deterioration.

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Types of repair and associated repair techniques may include:

- marine
- automotive
- aerospace
- industrial
- architectural
- civil construction.

Standards of repair may include:

- AS/NZ standards
- industry codes of practice
- original manufacturers standards.
-

Unit Sector(s)

Not applicable.

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PMBTECH406A Diagnose production equipment problems

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers diagnosing the causes of products faults and problems arising from the equipment/plant. These problems may be caused by inappropriate process conditions and/or equipment faults. The competency does not include the rectification of such faults or equipment diagnostic skills more appropriate to maintenance tradespersons, but does include diagnosis to a sufficient level so that identification of faults as equipment or process based can be made and appropriate directions can be given to rectify the problem.

Application of the Unit

Application of this unit

This competency applies to technicians who are required to examine products which have faults, even though they may not be rejects, and determine the likely causes of such faults. The technician might also be required to examine production faults such as where the process as a whole is not performing adequately. The technician would then further investigate the likely equipment, plant and/or process causes of the faults and isolate the most probable cause and recommend the solution. They may then monitor the implementation of the solution and check that the fault has been fixed.

It includes:

- examining products
- identifying faults
- identifying fault causes
- recommending solutions to faults
- checking the fault has been rectified.

While this unit does not require 'hands on competence' for the operation of process equipment, it does require an understanding of the principles of operation of the equipment and the impact of process conditions and equipment faults or changes on the product characteristics/properties. It also requires an understanding of the quality/ inspection/testing regime and the results of this regime and how process conditions and equipment faults or changes impact these results of this regime.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	**PERFORMANCE CRITERIA**
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.
1. Identify faults in products/production.	1.1 Examine products/production process. 1.2 Identify faults. 1.3 Categorise faults according to type/likely cause.

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	1.4 Prioritise faults for action.
2. Determine most probable possible cause(s) of fault	2.1 Analyse fault to determine possible causes. 2.2 Investigate possible causes to eliminate less probable causes. 2.3 Shortlist probable causes. 2.4 Check hypothesis of cause(s) is supported by the data available. 2.5 Identify most probable cause.
3. Implement solution to fault	3.1 Develop recommended solution to fault. 3.2 Check HSE implications of solution and modify solution as appropriate. 3.3 Communicate this recommendation as appropriate. 3.4 Check recommendation has been understood and can be implemented. 3.5 Check all hazard controls are in place. 3.6 Monitor progress of implementation. 3.7 Modify recommended solution as required.
4. Check fault solution has worked.	4.1 Monitor product/process for fault. 4.2 Monitor HSE impacts of changes. 4.3 Repeat analysis and solution process if required. 4.4 Update records and procedures to reflect successful solution.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

This competency requires a detailed understanding of:

- how the process/equipment works
- how raw material changes into product through the process/equipment
- impacts of different process conditions on the product
- impacts of different equipment settings/components on the product
- impacts of equipment failure/change/variation on the product
- product faults and their categories according to causes
- causes of all possible product faults due to process/equipment problems.

Note this is not primarily about faults caused by things outside the process/equipment (eg unspecified changes in feed/raw materials), but the possibility of this cause for a fault should be included as required knowledge.

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Language, literacy and numeracy requirements

This unit requires the ability to communicate to operators, tradespeople and other technical experts about technical issues.

Reading is required to the level of being able to interpret and apply procedures, technical manuals and manufacturer manuals. Writing is also required to be able to write maintenance and similar requests/orders, update procedures and write equipment/process condition specifications.

Numeracy is required to interpret test data, technical specifications, instrument readings and measurements. Some calculation may be involved in developing and implementing solutions.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This competency requires the diagnosis of real product faults and the development and implementation of solutions to these faults. The diagnosis of a number of faults with different types of causes should be required.

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- recognise defective product
- isolate one or two most likely causes, and justify the selection of those causes
- devise a permanent solution to the problem and justify that solution
- check that the solution works
- work with all the required people to make it happen.

Consistent performance should be demonstrated. For example, look to see that:

- defects with different root causes are analysed
- defects with both process condition and equipment problem causes are solved
- defects across the applicable range of products and processes are solved

Context of assessment

Competence in this unit may be assessed:

- on a processing plant as a routine part of the job
- as special projects on a processing plant

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- using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

Method of assessment

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency applies to technicians who have a role of problem solving product faults as it relates specifically to equipment/process problems. While the technician will take the lead role in this activity, they will need to liaise with a range of people at all levels in the organisation to obtain information and to implement the solution.

This diagnosis and improvement may take place as a result of a problem where the fault level is causing reject product, or it may occur as part of continuous improvement, or a kaizen blitz or other situation where the products are not faulty, but are being improved.

Fault

A fault is any defect in a product, whether it causes the product to be defective or not.

Typical faults may include:

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- colour variation (non-uniform, not to standard hue/intensity/opacity)
- surface blemishes (specs, marks)
- surface finish (gloss level, uneven)
- size/shape (distorted, wrong, variable)
- within specification, but highly variable, forms patterns etc (ie has 'assignable cause')
- strength/stiffness/physical properties (too high/low, variable, uneven)
- chemical properties
- physical/mechanical properties
- biological/biochemical/microbiological properties.

Examine

Examination of products/process may include:

- visual examination
- examination of product quality or other records
- examination of inspection records (if used)
- examination of test results (routine or otherwise)
- specific examination testing undertaken as part of a product improvement activity.

Possible causes

Possible causes include all feasible causes of the problem, before checking to eliminate some.

Investigate

Investigating possible causes includes:

- talking with operators and others
- checking machine histories for prevailing process conditions
- checking current process/equipment conditions
- carrying out small tests to determine the likelihood of a causal link between a condition and a fault.

Health Safety and Environment (**HSE**)

All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- laboratory test facilities for the product (although the conduct of tests is not part of this unit)

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- equipment test instruments for checking the condition of plant (although the conduct of these tests may not be part of this unit).

Process/equipment conditions

Process/equipment conditions may include:

- settings such as temperature, pressure
- rates such as feed rate, flow rate
- setting and adjustment of equipment parts
- worn and broken equipment parts.
-

Unit Sector(s)

Not applicable.

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PMBTECH501B Analyse equipment performance

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the analysis of the performance, and performance verification, of existing equipment. It applies typically to the extrusion, injection and related sectors of the industry.

This competency is typically performed by a senior technician who will take the lead in the data gathering phase and then analyses the data.

Application of the Unit

Application of this unit

This competency applies to technicians who will set up and operate performance verification trials and then analyse the results to determine actual compared to theoretical performance of equipment and equipment components.

It includes:

- calculating the theoretical performance of a screw, die, etc
- gathering data to determine the actual performance of the screw, die etc
- calculation of actual versus theoretical performance
- making recommendations as to the appropriate action to be taken based on the performance verification results
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has the prerequisites of *PMBTECH401B Predict polymer properties and characteristics* AND *MSAPMOPS401A Trial new process or product*

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Determine theoretical performance.	1.1 Identify item of plant and plant component(s) to be analysed. 1.2 Locate and interpret design specification. 1.3 Identify process materials being processes/to be processed during verification trial. 1.4 Determine process material properties under process conditions. 1.5 Calculate theoretical performance of component(s) with that material under those conditions.
2. Conduct trial.	2.1 Design verification trial to be compatible with theoretical analysis. 2.2 Determine measurements needed from trial to yield required data. 2.3 Select equipment suitable to give required measurements. 2.4 Arrange for verification trial with relevant process personnel.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	2.5 Set up required measurement equipment. 2.6 Supervise trial and ensure trial conditions are appropriate. 2.7 Collect trial data for analysis.
3. Verify performance of component(s).	3.1 Compare theoretical with actual performance. 3.2 Determine significance of variation between theoretical and actual performance. 3.3 Investigate any suspicious results and take appropriate action.
4. Recommend required action.	4.1 Determine appropriate action to bring performance to desired level. 4.2 Initiate the corrective action to procedures. 4.3 Determine measures to increase equipment productivity. 4.4 Re-check performance after corrective action is implemented.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the materials, equipment and process sufficient to predict their interactions and their impacts on performance.

Knowledge of organization procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Application of the knowledge of managing risks using the hierarchy of controls applied to the process. Application of approved hazard control, safety procedures, the use of PPE in relation to handling materials, equipment operation and cleanup.

Knowledge as a basis for solving processing and material problems, including:

- the characteristics and manufacturing behaviours of polymers involved in the process
- polymer materials, their additives and the rheological, heat and other effects of processing to the design of equipment and components to predict practical performance results
- calculate equipment and component performance from the design specification
- determine equipment and design performance from practical trials

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- determine the 'limiting component' in the performance of an item of equipment or a process
- determine possible performance of an item of equipment/process if practical improvements were made to the 'limiting item'.

Language, literacy and numeracy requirements

This unit requires high levels of numeracy and literacy with the ability to interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Where the assessee does not currently possess evidence of competency in *PMBTECH40A Predict polymer properties and characteristics* AND *PMBORG403B Conduct trails on products or processes*, they may be co-assessed with this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability to apply a understanding of material and process interactions to be able to interpret data and make judgements about the state of the equipment/component

Consistent performance should be demonstrated. For example, look to see that the performance of at least one type of product on a typical machine has been correctly tested and analysed and that there is evidence that other types of analyses can also be achieved.

Assessment method and context

Assessment will occur on industrial equipment in a work-like environment.

Competence in this unit may be assessed:

- on an appropriate processing plant requiring demonstration of operation and emergency stop procedures
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

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In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the analysis of equipment components such as screws and dies/tools or items of equipment or processes.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry, but does require both a theoretical/mathematical and a practical analysis of the process at a level equivalent to a screw/die analysis.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

These may include:

- extrusion
- injection
- blow moulding.

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Tools and equipment

This competency includes use of equipment and tools such as:

- measuring equipment (eg micrometers, tapes, verniers, scales)
- hand tools
- data analysis tools (eg computer programs for data recording and presentation).

Hazards

Typical hazards include:

- moving machinery
- hot surfaces and products.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

- worn components
- validation of new components to design specification
- component performance analysis in order to upgrade process performance.

Variables

Key variables to be monitored include:

- measurements
- machine characteristics.
-

Unit Sector(s)

Not applicable.

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PMBTECH502B Review and analyse production trials and specify retrials

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the reviewing of trial results, analysing and correcting trial outcomes, and specifying and carrying out retrial procedures.

This competency is typically performed by technicians/technologists in all sectors of the industry.

Application of the Unit

Application of this unit

This competency applies to technicians who analyse and review production trials. The key factors are the understanding of the purpose of the trials, and the interpretation of the trial results compared to that purpose.

It includes:

- new product trials
- new process trials
- new equipment trials
- modifications to product trials
- modifications to process trials
- modifications to equipment trials.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has the prerequisite of *MSAOPS401A Trial new process or product*.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Review trial results.	1.1 Confirm trial objectives as a basis for comparison prior to review of results. 1.2 Review trial product quality results and compare with trial objectives to identify variations. 1.3 Review trial production results and compare with trial objectives to identify variations.
2. Analyse and correct trial outcome.	2.1 Analyse trial results to establish priorities for the correction of parameters which are outside specifications. 2.2 Recommend changes to achieve product quality and production requirements. 2.3 Make changes in to procedures to achieve the required product quality and production requirements.
3. Specify and carry out retrial procedures.	3.1 Specify retrial objectives and priorities to procedures. 3.2 Carry out retrial variations to achieve the trial

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	objectives to procedures. 3.3 Record trial results to procedures.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the materials, equipment and process sufficient to interpret trial results and specify appropriate retrial conditions.

Knowledge of organization procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Application of the knowledge of managing risks using the hierarchy of controls applied to the process. Application of approved hazard control, safety procedures, the use of PPE in relation to handling materials, equipment operation and cleanup.

Knowledge as a basis for solving processing and material problems, including:

- a thorough understanding of polymer materials and processing
- calculate results from trial data
- interpret trial results in terms of trial objectives
- determine variations to trial procedures to overcome limitations found
- interpret results in terms of product end use requirements
- make recommendations for changes to materials, process and product based on trial results
- trial objectives
- preliminary product specifications (physical properties, size, weight, appearance)
- production requirements (output, rejects, yield, practical operating window)
- trial results
- product quality results
- production results
- changes
- product design and specifications
- mould, die and/or tooling design and construction
- material grade
- machine configuration or specification
- production specifications

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- processing parameters
- retrial objectives
- product quality
- production requirements
- variations
- sample size
- machine parameters
- material grade changes
- mould, die and/or tooling changes
- machine configurations.

Language, literacy and numeracy requirements

This unit requires high levels of numeracy and literacy with the ability to interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Where the assessee does not currently possess evidence of competency in *MSAOPS401A Trial new process or product*, it may be co-assessed with this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability to apply an understanding of polymer materials and processing to the interpretation of trial results and making judgements about the trials in terms of the trial objectives

Consistent performance should be demonstrated. For example, look to see that the performance of at least one type of product or process trial on a typical machine has been correctly analysed and that there is evidence that other types of analyses can also be set up, run and completed satisfactorily.

Assessment method and context

It is preferred that assessment takes place on industrial equipment in a work-like environment.

Competence in this unit may be assessed:

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  - on a processing plant, allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry, but does require both a theoretical/mathematical and a practical analysis of the trial data.

The competency does not require knowledge of industry sectors and materials other than that in which the technician works. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

Procedures

All operations are performed in accordance with procedures.

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Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- procedures
- product specifications
- trial results and data
- data analysing and reporting tools (eg computer spreadsheets).

Hazards

Typical hazards include operating equipment.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

- new products or processes
- new dies, moulds or tooling
- modified equipment or components
- modified or new materials.

Variables

Key variables to be monitored include production data.

Unit Sector(s)

Not applicable.

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PMBTECH503B Determine rheology and output of plastics materials from processing equipment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the application of knowledge of polymer rheology to the flow of polymers through processing equipment, including extruders and injection moulding equipment and the dies and moulds fitted to that equipment.

This competency is typically performed by senior technicians.

Application of the Unit

Application of this unit

This competency applies to technicians who need to perform calculations using the rheological properties of polymers and apply that to their performance in process equipment.

It includes:

- Newtonian and non-Newtonian flow
- shear force and shear rate calculations
- output calculations
- density/temperature/viscosity relationships and calculations.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has a prerequisite of *PMBTECH401B Predict polymer properties and characteristics*.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Determine flow characteristics of polymer compound.	1.1 Calculate and describe shear and shear rates. 1.2 Distinguish between Newtonian and non-Newtonian flow. 1.3 Identify the characteristics of polymer structures which influence flow. 1.4 Identify the relationships between density, temperature and viscosity for polymers. 1.5 Identify the flow characteristics of a polymer compound based on its structure and temperature.
2. Calculate flow rate of polymer compound.	2.1 Use equipment dimensions and data to determine shear rate of polymers through that equipment. 2.2 Calculate output from equipment using viscosity curves and shear rate diagrams. 2.3 Calculate mean velocity at critical points in a process. 2.4 Determine the characteristic curves for the screws and dies in processing equipment, and the resultant operating point for the system.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the principles of rheology, how rheological properties vary with temperature and how they impact on process efficiency and equipment design.

Knowledge of organization procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Knowledge as a basis for solving processing and material problems including:

- Newtonian flow
- non-Newtonian flow
- density/temperature/viscosity relationships
- quantitatively determining shear, shear rate, output, viscosity/density changes with temperature.

Language, literacy and numeracy requirements

This unit requires high level numeracy skills such as are needed for the use of complex algebraic equations, non-linear functions, simultaneous equations and the interpretation of non-linear graphs. Literacy is also required at least equivalent to senior secondary school.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability to determine and apply rheology to relevant polymers.

Assessment method and context

Assessment will occur using relevant industrial polymers and rheology relevant to the process/product and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- using an appropriate, industrial polymers and rheology relevant to the process/product

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- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the rheology of major polymer compounds and the temperature and shear effects on viscosity.

This competency applies to all sectors within the plastics, rubber and cablemaking industry.

Standard procedures means all relevant workplace procedures, and relevant industry and government codes and standards.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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Unit Sector(s)

Not applicable.

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PMBTECH504B Determine heat transfer loads for processing equipment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the application of a knowledge of heat transfer and heat balance principles to the design and use of processing equipment.

This competency is typically performed by senior technicians.

Application of the Unit

Application of this unit

This competency applies to technicians who need to determine heating and/or cooling loads for processing equipment.

It includes:

- conduction, convection and radiation
- thermal properties of materials, particularly polymers
- methods of heating polymer materials
- cooling systems
- energy balances.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Calculate heat transferred from/to items.	1.1 Calculate conductive heat transfer to/from an object. 1.2 Calculate convective heat transfer to/from an object. 1.3 Calculate radiative heat transfer to/from an object. 1.4 Calculate combined heat transfer to/from an object, including resistances in series and parallel.
2. Calculate temperature change caused by a change in heat content.	2.1 Calculate temperature change caused by heating/cooling of polymer compounds in typical examples of processing equipment. 2.2 Calculate change in heat content caused by shear on a polymer compound. 2.3 Calculate temperature rise caused by shear on a polymer.
3. Select appropriate heating and/or cooling mechanism for an application.	3.1 Compare rates of heat transfer/overall heat transfer coefficients for major methods of heating and cooling. 3.2 Determine appropriate methods of varying/controlling rates of heat transfer.

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	3.3 Calculate heat transfer rates under a range of conditions.
4. Determine heating required to suit process conditions.	4.1 Determine heating requirements to obtain correct viscosity for processing. 4.2 Select appropriate heat transfer mechanism(s) to achieve desired conditions.
5. Conduct energy balance over process components.	5.1 Determine overall heating load for process components. 5.2 Determine overall cooling load for process components. 5.3 Determine the adequacy (or otherwise) of the process/plant heating/cooling system to cope with this.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of heat transfer principles and calculations sufficient to determine the heating/cooling loads of an existing or a new process. Knowledge of the effects of heat/temperature on the materials being processed and the products being made sufficient to determine the processing temperatures and heating/cooling rates required to achieve a satisfactory product from an efficient process.

Knowledge of the enterprise's procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Knowledge as a basis for solving processing and material problems including:

- conduction
- convection
- radiation
- combined conduction/convection
- specific heat capacity
- mechanical work/heat relationships
- energy balances.

Language, **literacy and numeracy requirements**

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This unit requireshigh level numeracy skills at least equivalent to senior secondary school levels.

Literacy is also required at least equivalent to senior secondary school level.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that the principles be understood and that they are able to be applied to real workplace situations. Competence must be demonstrated in the ability to undertake quantitative analyses and then apply the results to determine heating and cooling loads and flow/supply.

Assessment method and context

Assessment will occur using industrial situations and equipment using industrial polymers and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- using appropriate, industrial equipment, situations and polymers
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

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This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the heating/cooling loads of all processing equipment and requires the quantitative determination of loads.

This competency applies to all sectors within the plastics, rubber and cablemaking industry.

Standard procedures means all relevant workplace procedures, policies and relevant industry and government codes and standards.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Unit Sector(s)

Not applicable.

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PMBTECH505B Choose polymer materials for an application

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the application of a knowledge of polymerisation, polymer structure and modifications of polymer materials to their properties so enabling the choice of an appropriate polymer compound for an applications.

This competency is typically performed by technicians developing new products or applying this knowledge set to advanced process/product problem solving.

Application of the Unit

Application of this unit

This competency applies to technicians who are able to bring together an understanding of the basics of chemistry and polymers and apply this understanding to determine the properties of polymers and polymer products.

It includes:

- the influence of polymerisation mechanisms on polymer properties
- the influence of polymer structure on polymer properties
- methods of modifying the properties of raw polymers
- the selection and interpretation of polymer tests
- the ability to bring these skills together to select appropriate material(s) for an application.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has a prerequisite of *PMBTECH401B Predict polymer properties and characteristics.*

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Determine possible polymer properties based on polymer type.	1.1 Estimate molecular weight distribution changes with polymerisation mechanisms and conditions. 1.2 Predict the impact of monomer and polymer structure on polymer properties.
2. Estimate polymer properties based on polymer structure.	2.1 Predict property changes caused by polarity and intermolecular forces. 2.2 Determine possible polymer properties based on chain flexibility variations caused by changes in regularity, tacticity and intermolecular forces. 2.3 Estimate polymer properties based on molecular weight/molecular weight distribution, degree of cross-linking. 2.4 Predict barrier properties based on molecular orientation and degree of crystallisation.
3. Choose a polymer compound for an application.	3.1 Select appropriate base polymer/polymers for an application based on the polymer properties. 3.2 Determine reinforcement(s)/additives required to

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	meet product specification. 3.3 Predict failure mechanism for selected compound and modify selection if appropriate. 3.4 Determine the need for polymer compatibilisers and specify appropriate use if required. 3.5 Develop formulation and select appropriate production
4. Organise testing of polymer and interpret test results.	4.1 Select appropriate test(s) for compounded polymer based on test purpose and limitations and material being tested. 4.2 Test colour using colour coordinates as required. 4.3 Interpret test results and modify formulation/production method as required to meet product specification.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the polymerisation process and polymer characteristics sufficient to enable the selection of polymers with appropriate base properties.

Knowledge of organization standard procedures and policies. Knowledge of the relevant regulatory requirements and national/international standards along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

This unit assumes a knowledge of basic chemistry, including atomic structure, molecular weight, periodic table, ionic and covalent bonding, intermolecular bonding, hydrogen bonding, structure of organic compounds, functional groups and typical reactions, saturated and unsaturated compounds, aromatic compounds, hydrolysis and addition reactions.

Knowledge as a basis for solving processing and material problems including:

- property changes caused by different mechanisms and conditions for addition polymerisation
- typical processing conditions for typical polymers such as polythene
- property changes caused by using bulk, suspension, solution and emulsion addition polymerisation
- property changes caused by different mechanisms for condensation polymerisation

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- the formation of cross-linked polymers
- the properties of cross-linked polymers
- impact of polymerisation process on polymer properties
- impact of polymer structure on polymer properties
- modifications to plastics
- test methods
- properties and applications of polymers
- the impact of tacticity on addition polymer properties
- the property changes caused by different copolymer structures
- the influence of molecular structure on chain regularity
- the difference between polymer reinforcements and polymer composites.

Language, **literacy and numeracy requirements**

This unit requires high level literacy and numeracy.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that the polymer and additive properties be understood and the chemistry behind these properties can be explained. Competence must be demonstrated in the ability to predict appropriate polymers and additives from the required properties of a product.

Consistent performance should be demonstrated. For example, look to see thatselections made can be justified.

Assessment method and context

Assessment will occur using industrial polymers and typical/actual applications and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- using appropriate, industrial polymers and typical/actual applications
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios

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- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Unit Sector(s)

Not applicable.

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PMBTECH506B Analyse the design of products and tools

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the impact of die/tool design on the product and process.

This competency is typically performed by experienced technicians/technologists working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to technicians/technologists who work with dies/tools. The key factors are the identification of key features, their impact on the process/product and the recommendation of modifications to dies/tools.

It includes:

- describing components and functions using appropriate terminology
- interpreting drawings
- identifying design features and their impact on product
- making recommendations for improving/optimising die design.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has the prerequisites of:

- *MEM9.2B Interpret technical drawing*
- *MSAOPS401A Trial new process or product*
-

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Identify tool components and operating principles.	1.1 Identify the common types of tools and their advantages and limitations. 1.2 Choose appropriate tool components and systems.
2. Interpret tool drawings.	2.1 Identify tool type from drawing. 2.2 Identify tool components from drawing.
3. Identify tool and part features that affect product quality.	3.1 Recognise common product faults due to tool problems. 3.2 Identify the cause of the faults. 3.3 Recommend modifications to tool or material to rectify.
4. Identify product features that affect tool design.	4.1 Recognise good and poor product design features in terms of ease of tool design and manufacture. 4.2 Identify the critical product design features which affect the selection of an appropriate manufacturing technology. 4.3 Identify the critical product design features which affect tool design.
5. Analyse tool design.	5.1 Use the process for the design, manufacture and

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	trialling of tools. 5.2 Use analysis and balancing tools as appropriate to examine optimum tool design. 5.3 Suggest possible improvements to tool or product design.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the materials, equipment and process sufficient to predict their interactions and their impacts on performance.

Knowledge of organization procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Knowledge as a basis for solving processing and material problems including:

- interpret technical drawings and specifications for tools
- function of tool components and systems
- function of clamping/mounting/ancillary systems
- tool operating principles and adjustments
- impact of product design on tooling design
- impact of tooling design on product
- impact of tool design and material properties on productivity
- the technical strengths and weaknesses of common processing and fabrication technologies and their relative suitability for classes of products
- the economic and market features of common processing and fabrication technologies and their impact on the selection of a technology for a product
- impact of polymer and polymer compound properties on tool performance and product
- material/tool interactions
- the impact of different tool designs on product and productivity
- the temperature effects on process and product
- distinguish between types of tool designs required for different product types
- fine tune and balance (where appropriate) the tooling.

Language, **literacy and numeracy requirements**

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This unit requires high levels of numeracy and literacy with the ability to interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The critical aspects for this unit of competency is the ability to apply a thorough understanding of polymer materials, their additives and the rheological, heat and other effects of processing to the design of tools and components. This understanding of material and process interactions should also be able to be applied in the interpretation of technical specifications and drawings.

Assessment method and context

Assessment will occur on industrial tools and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- using appropriate, industrial tools
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
    - by using a suitable simulation and/or a range of case studies/scenarios
    - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

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This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency unit includes the analysis of dies, tools and moulds and the products made from them. It does not include moulds such as are used for composites or thermoforming.

The competency does not require a knowledge of industry sectors and materials other than that in which the technician works. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Unit Sector(s)

Not applicable.

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PMBTECH507B Develop fibre composite products using cored-laminate techniques

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the development of designs for 'sandwich type' fibre-composite laminates and the solving of technical problems.

Application of the Unit

Application of this unit

This competency is typically performed by technicians applying knowledge of materials, product purpose and processes to the design of 'sandwich' composites that meet specific performance requirements in terms of strength, stiffness and/or weight. It also requires transferring and applying theoretical concepts and skills to analyse and plan approaches to technical problems.

The technician will:

- determine appropriate materials and processes to meet design objectives
- determine appropriate equipment and process settings and adjustments
- develop drawings of new product
- solve technical problems associated with the design and manufacturing procedures.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has the prerequisite of *MEM9.3B Prepare basic engineering drawing*.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Confirm product specification.	1.1 Confirm physical/structural properties required of product. 1.2 Confirm other requirements of product. 1.3 Identify relevant regulations/standards/codes of practice which may be applicable. 1.4 Draw/use hand sketch to confirm product size and shape.
2. Identify technical requirements.	2.1 Determine the laminate properties appropriate for the job. 2.2 Select the appropriate core material(s). 2.3 Select the appropriate resin, matrix and other materials. 2.4 Determine joints, attachment points and other special features required. 2.5 Determine lay-up technique to be used.
3. Develop specification for manufacturing product.	3.1 Develop technical/engineering drawing of new product to company required standards. 3.2 Develop material list/specification for new product.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	3.3 Develop manufacturing procedures/specifications for new product. 3.4 Complete required documentation.
4. Make trial samples, as required.	4.1 Liaise with production and other relevant people to ensure specifications/procedures are clear, adequate and understood. 4.2 Provide technical expertise to the production process as required to facilitate manufacture. 4.3 Test samples for function and quality. 4.4 Modify designs, where necessary to meet manufacturing and other requirements.
5. Anticipate and solve problems.	5.1 Recognise a problem or a potential problem. 5.2 Determine possible cause. 5.3 Refer problems outside area of responsibility to appropriate person, with possible cause. 5.4 Seek information and assistance as required, to solve problems 5.5 Solve problems within area of responsibility. 5.6 Follow through items initiated until final resolution has occurred.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production. For example, poor adhesion can result in delamination under stress, impact and load conditions

Knowledge and ability to implement organization procedures, quality requirements at each production stage and relevant regulatory requirements, within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls applied to the production process. Application of approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup

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Knowledge as a basis for developing designs that meet new product requirements:

- principal construction techniques and the technical advantages of various types
- material properties and their suitability for use as core (eg PVC rigid foams, PU foams, SAN foams, linear PVC foams, plywood, balsa, and various honeycomb materials)
- layered or laminate structural behaviour
- hand lay-up and vacuum-bagging techniques
- failure modes
- function and operating principles of composites forming equipment, machine components and ancillary equipment
- impact of temperature, pressure, time, on product quality and production output
- correct selection and use of equipment, materials, processes and procedures
- impact of variations in raw materials and equipment operation in relation to final product
- factors which may affect product quality or production output and appropriate remedies.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- identify and describe own role and role of others involved directly in the design and manufacturing process
- identify when assistance is required to solve problems.

Language, literacy and numeracy requirements

This unit requires the ability to write and interpret technical specifications and reports.

Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability to select the appropriate moulded laminate structure to meet the cost and performance specification for the particular job.

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

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- identify critical materials properties and structural considerations in relation to the design objectives and the end product
- make design modifications , as required
- identify and develop solutions to technical problems

Consistent performance should be demonstrated. For example, look to see that:

- design objectives are consistently met
- manufacturing codes of practice are observed

Assessment method and context

Assessment will occur on a sandwich-type composite design process and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- over a range of actual design projects which are implemented in the workplace
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

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Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency applies to the design of composite products using sandwich construction within the plastics and rubber industries. It covers the design of new sandwich products within the scope of normal sandwich product manufacture for the enterprise, ie using the range of materials and techniques which are standard within the enterprise.

For design outside this range, see *PMBTECH601A Develop a new product*.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- drawing tools (including computer aided drawing)
- measuring tools.

Typical hazards include:

- hazardous vapours and materials
- fibres, airborne and handled.

Problems

'Anticipate and solve problems' means develop solutions to a wide range of problems associated with the design and manufacture of a new product.

Typical design and product problems may include:

- structural optimisation
- strength problems
- core shearing
- bending
- cost.

Variables

Key design variables include:

- size
- weight
- thickness
- loading modes
- strength
- stiffness
-

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Unit Sector(s)

Not applicable.

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PMBTECH508A Develop a new compound

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the development of a new compound/formulation or the major modification of an existing compound. The aims of the modification may be broad (eg reduce cost, improve performance, improve manufacturing) or specific (eg meet a particular specification). Typically the brief will be broad enough to require examination of all components of the compound.

This technician would typically take the lead in this development project, although they may be working with a more senior technician as part of a larger project.

Application of the Unit

Application of this unit

This competency applies to technicians who are required to develop new compounds/ formulations and demonstrate that an appropriate formulation and manufacturing method have been developed.

It includes:

- determining the appropriate base polymer/polymer blend
- determining the appropriate additives
- determining the appropriate mixing methods and order
- verifying that compound and methods are acceptable in the factory
- ensuring the factory is able to mix this compound as a routine product.

This competency may be used to complement *PMBTECH505A Choose polymer materials for an application*. While PMBTECH505 concentrates on selecting the right polymer from a knowledge of polymer properties, this unit concentrates on the creation of an appropriate formulation using that polymer. Where choice of polymer is obvious/restricted/trivial then this unit stands alone from TECH505.

Where colour is an important part of the compound then *PMAOPS550A Develop a colour formulation* may also be a complementary unit.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	**PERFORMANCE CRITERIA**
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Confirm required properties of compound.	1.1 Communicate with stakeholders regarding technical and aesthetic specification. 1.2 Identify project constraints such as timelines and cost. 1.3 Draft compound specification and project plan. 1.4 Identify required tests to verify compound meets specification. 1.5 Confirm with stakeholders and modify as appropriate.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
2. Develop base formulation.	2.1 Identify appropriate base polymer/polymer blend. 2.2 Select appropriate fillers/reinforcers and estimate required proportions. 2.3 Select appropriate plasticisers and related materials and estimate required proportions. 2.4 Select appropriate other materials and estimate required proportions. 2.5 Draft initial formulation. 2.6 Draft trial mixing procedure and order of addition. 2.7 Identify any Health Safety and Environment (HSE) issues and modify as appropriate.
3. Mix, test and modify formulation.	3.1 Identify and control all hazards for laboratory development program. 3.2 Obtain all required materials and tools/ equipment. 3.3 Produce the trial compound following the draft procedures. 3.4 Evaluate the compound compliance with the specification. 3.5 Modify formulation and procedure as required. 3.6 Draft factory trial formula and procedure
4. Monitor factory trials.	4.1 Identify and control al HSE issues for factory trials. 4.2 Ensure all required materials and tools/equipment are available. 4.3 Organise trial(s) at an appropriate time. 4.4 Ensure trial is monitored and required data collected. 4.5 Evaluate factory trial compound and procedure. 4.6 Modify formulation and procedure as required.
5. Complete compound development.	5.1 Ensure final formulation and procedures are recorded in standard procedures. 5.2 Ensure all required materials and tools and equipment will be routinely available as required. 5.3 Ensure HSE controls are standardised. 5.4 Ensure skill needs of operators have been addressed.

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	5.5 Complete all required reports and records. 5.6 Advise stakeholders of the outcome of the project.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Competence in this unit requires:

- an understanding of compound components to a level necessary to select appropriate components from a range of similar, competing components
- an understanding of mixing processes to a level necessary to select an appropriate mixing method, an order of addition and mixing conditions
- appropriate tests so as to select the tests needed to check for compliance with the specification, and interpret test results
- HSE issues related to various compound components.

Language, literacy and numeracy requirements

This unit requires the ability to communicate at all levels about technical issues and bring agreement as to requirements from the different parties.

Reading is required to the level of interpreting technical information, and writing technical specifications, procedures and reports.

Numeracy is required to the level of interpreting technical information and test results, calculating required proportions and scaling up to a factory sized trial.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

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This competency should be assessed by examining a number of compound development projects where that development has resulted in a new compound introduced into the factory.

Critical aspects

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- interpret the requirements of the new compound and express this in suitable form
- make appropriate choices of components and justify those choices
- develop appropriate mixing procedures and conditions and justify those choices
- introduce the new compound into the factory successfully.

Consistent performance should be demonstrated. For example, look to see that:

- a range of compounds meeting different types of specifications are developed
- a range of compounds requiring different components/component amounts are developed.

Context of assessment

Competence in this unit may be assessed:

- on the plant
- using questions to assess knowledge
- in a laboratory/pilot plant
- by using suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

Method of assessment

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

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Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency applies to technicians who develop new compounds/formulations or who make significant modifications to existing compounds. They will typically be based in a laboratory/office or similar and will also have responsibility for ensuring the new compound works in the factory.

A technician working at this level would typically take the lead responsibility for the development of a new compound, but may work with other technicians of similar or greater responsibility for large or complex projects or as part of the development of a new product

Compound

Compound is used to mean any mixture of materials which is undertaken to a set formula and in specified proportions.

Tests

Tests includes the normal range of physical, chemical and environmental (weathering) tests which might be applied to the product.

Identify polymers

Identification of base polymer is a necessary starting point for any compound, but this competency does not necessarily require the choosing of a polymer from an understanding of its characteristics. Identification may be done in liaison with others, or by choosing the base polymer used in other products with similar requirements.

Select components

Selecting of components, and the proportions of components to be used should be done from a knowledge of a wide range of possible components, the properties each would bring to the compound, the relative advantages and disadvantages of each and the change in compound properties with changing amounts of each component.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Health, Safety and Environment (HSE)

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All operations are subject to stringent Health, Safety and Environment requirements, which may be imposed through State or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the technician needs to ensure the HSE requirements take precedence.

Unit Sector(s)

Not applicable.

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PMBTECH509A Modify an existing product

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the major modification of an existing product. The aims of the modification may be broad (eg reduce cost, improve performance, improve manufacturing) or specific (eg meet a particular specification). Typically the brief will be broad enough to require examination of a broad range of design features.

This technician would typically take the lead in this development project, although they may be working with a more senior technician as part of a larger project.

Application of the Unit

Application of this unit

This competency applies to technicians who are required to develop modified products and demonstrate that an appropriate product and manufacturing method have been developed.

It includes:

- determining the appropriate product specification
- confirming the appropriate compound
- identifying equipment/tooling requirements
- monitoring trials
- checking the modified product meets its requirements
- ensuring the factory is able to make this product as a routine product.

This competency may be used to complement *PMBTECH508A Develop a new compound*. While TECH508 concentrates on developing a compound, this unit concentrates on the modification of a product, which may include a change of compound. Where choice of compound is obvious/restricted/trivial then this unit stands alone from TECH508.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Confirm required product specification/requirements.	1.1 Communicate with stakeholders regarding technical and aesthetic specification and other requirements. 1.2 Identify project constraints such as timelines and cost. 1.3 Draft product specification and project plan. 1.4 Identify required tests to verify product meets specification. 1.5 Confirm with stakeholders and modify as appropriate.
2. Determine requirements for manufacture.	2.1 Identify appropriate compound. 2.2 Select process, equipment and tooling. 2.3 Select appropriate process conditions.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	2.4 Determine other requirements for manufacture. 2.5 Draft trial manufacturing procedure. 2.6 Identify any HSE issues and modify as appropriate.
3. Make trial/prototype products.	3.1 Identify and control all hazards for laboratory development program. 3.2 Obtain all required materials and tools/ equipment. 3.3 Produce the trial product following the draft procedures. 3.4 Evaluate the product's compliance with requirements. 3.5 Modify design and procedure as appropriate. 3.6 Draft factory trial procedure.
4. Monitor factory trials.	4.1 Identify and control al HSE issues for factory trials. 4.2 Ensure all required materials and tools/ equipment are available. 4.3 Organise trial(s) at an appropriate time. 4.4 Ensure trial is monitored and required data collected. 4.5 Evaluate factory trial product and procedure. 4.6 Modify specification procedure as appropriate.
5. Complete product modification.	5.1 Ensure final specification and procedures are recorded in standard procedures. 5.2 Ensure all required materials and tools and equipment will be routinely available as required. 5.3 Ensure HSE controls are standardised. 5.4 Ensure skill needs of operators have been addressed. 5.5 Complete all required reports and records. 5.6 Advise stakeholders of the outcome of the project.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Competence in this unit requires:

- an understanding of product design to a level necessary to select appropriate design components from a range of similar, competing components
- an understanding of making processes to a level necessary to select an appropriate set of process, equipment, tools and conditions and develop procedures
- appropriate tests so as to select the tests needed to check for compliance with the specification, and interpret test results
- HSE issues related to various products, processes, equipment, tools and process conditions.

Language, **literacy and numeracy requirements**

This unit requires the ability to communicate at all levels about technical issues and bring agreement as to requirements from the different parties.

Reading is required to the level of interpreting technical information, and writing technical specifications, procedures and reports.

Numeracy is required to the level of interpreting technical information and test results, calculations related to design and scaling up to a factory sized trial.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

This competency should be assessed by examining a number of product modification projects where that development has resulted in a modified product being introduced into the factory.

Critical aspects

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- interpret the requirements of the modified product and express this in suitable form
- make appropriate choices of process, equipment, tools and conditions and justify those choices

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- develop appropriate manufacturing procedures and design specifications and justify those choices
- introduce the modified product into the factory successfully.

Consistent performance should be demonstrated. For example, look to see that:

- a range of products meeting different types of specifications are developed
- a range of products requiring different process/equipment/tools/conditions are developed.

Context of assessment

Competence in this unit may be assessed:

- on the plant
- using questions to assess knowledge
- in a laboratory/pilot plant
- using suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

Method of assessment

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

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Context

This competency applies to technicians who make significant modifications to existing products. They will typically be based in a laboratory/office or similar and will also have responsibility for ensuring the new product works in the factory.

A technician working at this level would typically take the lead responsibility for the product modification, but may work with other technicians of similar or greater responsibility for large or complex projects or as part of the development of a new product

Compound

Compound is used to mean any mixture of materials which is undertaken to a set formula and in specified proportions.

Tests

Tests includes the normal range of physical, chemical and environmental (weathering) tests which might be applied to the product.

Identify compound

Identification of compound is a necessary starting point for any product, but this competency does not necessarily require the choosing of a compound from an understanding of its characteristics. Identification may be done in liaison with others, or by choosing the compound used in other products with similar requirements.

Select process

Selecting process, equipment and tooling to be used should be done from a knowledge of a wide range of possible processes equipment and tooling, the properties each would bring to the product, the relative advantages and disadvantages of each and the change in product properties with process, equipment and tooling changes.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Health, **Safety and Environment** (**HSE**)

All operations are subject to stringent health, safety and environment requirements, which may be imposed through State or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the technician needs to ensure the HSE requirements take precedence.

Unit Sector(s)

Not applicable.

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PMBTECH510A Analyse failure in polymeric materials

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the viscoelastic response of polymeric materials to stress and strain under various conditions. It covers the response of different polymers, compounds and physical shapes with different applications of stress and strain.

Application of the Unit

Application of this unit

This competency applies to technicians who are required to differentiate between products and compounds based on their response to applied stress/strain.

It includes:

- crystalline and amorphous polymers
- reinforced (fillers or fibres) and filled compounds
- crosslinked and uncrosslinked polymers
- impact, steady and repeated application
- application under different physical and chemical conditions
- response of different shapes
- applications of this to typical products/situations.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Analyse response to steady and static loads.	1.1 Determine stress strain response. 1.2 Determine tear/notch failures. 1.3 Identify modulus and yield. 1.4 Identify creep and stress relaxation. 1.5 Determine stiffness. 1.6 Identify applications where the typical viscoelastic response of polymers is an advantage. 1.7 Identify applications where the typical viscoelastic response of polymers must be modified and common methods of modification.
2. Analyse response to time varying loads.	2.1 Determine hysteresis in tensile and shear loadings. 2.2 Determine the effect of slow/rapid (impact) loading. 2.3 Identify failure modes in flex cycling 2.4 Identify fatigue failure. 2.5 Identify failures in sinusoidal loadings. 2.6 Identify applications where the typical

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	viscoelastic response of polymers is an advantage. 2.7 Identify applications where the typical viscoelastic response of polymers must be modified and common methods of modification.
3. Analyse the effect of environment/history on mechanical response.	3.1 Determine effect of temperature on response. 3.2 Determine effect of surface degradation on response. 3.3 Determine effect of molecule/fibre/filler orientation on response. 3.4 Determine the effect of environmental degradation on failure. 3.5 Identify applications where the typical response of polymers is an advantage. 3.6 Identify applications where the typical response of polymers must be modified and common methods of modification.
4. Analyse the effect of shape on mechanical response.	4.1 Determine the effect of shape on the stress/strain relationship (triaxiality). 4.2 Determine the effect of shape on stiffness. 4.3 Determine the effect of shape on response to cyclical loads. 4.4 Determine the effect of shape on creep and relaxation. 4.5 Identify applications where the typical response of polymers is an advantage. 4.6 Identify applications where the typical response of polymers must be modified and common methods of modification.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Competence in this unit requires the ability to apply and explain:

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- classical (ie elastic) stress and strain
- classical (ie elastic) Young's modulus and Poisson ratio
- stress, compression, shear and torsion
- stiffness and bending moments
- application of the above for viscoelastic bodies
- models of viscoelasticity
- creep and relaxation
- effects of temperature (above and below the glass transition point)
- effects of degradation, eg surface oxidation (such as UV, O3); swelling (such as solvent, chemical)
- three dimensional responses to stress
- responses to stress cycling, including heat build up
- mechanical responses to changing the properties of polymer structures and components

Language, **literacy and numeracy requirements**

This unit requires the ability to interpret and apply technical information.

Reading is required to the level of reading and applying technical brochures, books and other information.

Numeracy is required to the level of applying technical information and calculating stress/strain and related data, drawing and interpreting graphs.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- explain test results in terms which are appropriate to the polymeric material of the sample
- apply the results of the analyses to typical applications
- identify applications where typical polymer properties are an advantage
- distinguish between applications where polymers may be used satisfactorily (although without an inherent advantage) and those where it has an inherent advantage.

Consistent performance should be demonstrated. For example, look to see that:

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- the model(s) of viscoelasticity can be consistently applied to a range of likely situations
- the response to the application of stress in a range of circumstances can be explained
- the effect of shape can be predicated and explained for different stress application situations.

Context of assessment

This unit will require an assessment of the underpinning principles and should also include practical analyses as indicated by the elements. Such practical would typically be undertaken in a laboratory, either in an industry workplace or a teaching facility

Competence in this unit may be assessed:

- in a teaching facility laboratory
- in an industrial laboratory
- in a situation where the tests can be done
- using suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

Method of assessment

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

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Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency applies to technicians who are required to analyse the mechanical/ physical responses of polymer structures and components. These may include:

- large structural beams,
- small mechanical components,
- damping products such as bridge or acoustic bearings
- other items where the mechanical/physical properties are important.

It includes a wide range of polymer compounds including:

- crystalline and amorphous polymers
- reinforced (fillers or fibres) and filled compounds
- crosslinked and uncrosslinked polymers.

However, the properties of these polymers is not the prime focus of this unit.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. ASNZ/ISO standards for mechanical/physical testing of polymers will be relevant here and appropriate standards should be followed.

Tools and equipment

This competency includes use of equipment and tools such as:

- stress/strain testers
- impact testers
- cycling testers
- environmental aging equipment
- basic length/thickness measuring equipment.

Hazards

Typical hazards include:

- stored energy (eg in stressed test samples
- test preparation equipment
- conditions and materials used for causing sample degradation.
-

Unit Sector(s)

Not applicable.

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PMBTECH601B Develop a new product

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the development of a new product for a company and the facilitation of its initial production.

This competency is typically performed by high level staff, working as part of a product design, development and implementation team and taking a lead technical role.

Application of the Unit

Application of this unit

This competency applies to operators who are required to people who develop new products to meet a specified end use. This will involve working closely with a range of management and operations personnel and requires balancing the business and technical sides of the new product. This unit of competency applies to the technical expert.

Critical aspects for success include:

- ensuring the technical performance meets the customer's needs
- making sure the market needs of cost, timeliness and quality are appropriately balanced
- designing a product and process which can be efficiently made by the company
- liaising with the required people to ensure tooling design and manufacture and equipment modification is correct
- optimising the process for the new product at the completion of the development phase.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has the prerequisites of:

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- *PMBTECH502B Review and analyse production trials and specify retrials*
- *PMBTECH505B Choose polymer materials for an application*
- *MEM15.1B Perform basic statistical quality control*
-

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	**PERFORMANCE CRITERIA**
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Confirm design brief of new product.	1.1 Communicate with customer and other key stakeholders and agree on; technical specification, aesthetic requirements, timelines, cost, and other market requirements. 1.2 Determine regulatory/industry code/intellectual property requirements for product. 1.3 Identify possible tooling/process/equipment need 1.4 Develop design brief, including relevant drawings, to meet needs. 1.5 Obtain 'sign off' on total design brief from all relevant persons.
2. Determine material requirements for product.	2.1 Select appropriate base polymer grade/polymer blend or range of polymers/grades for evaluation. 2.2 Select type(s) of reinforcement and other additives

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	needed 2.3 Determine material testing and evaluation regime required to meet product end use requirements, including regulatory/ industry code requirements. 2.4 Arrange for compounding, testing and evaluation of trial materials. 2.5 Interpret material trial results and guide material trial process. 2.6 Determine final materials specification.
3. Determine process requirements for product.	3.1 Select appropriate process to make product based on appropriate factors 3.2 Determine any special process/equipment requirements for this product. 3.3 Communicate with production personnel to determine their concerns and/or special needs.
4. Ensure process needs for new product have been met.	4.1 Liaise with tool/ die/ mould/equipment design/procurement personnel. 4.2 Interpret hardware specifications and ensure they are appropriate for the job required. 4.3 Liaise with process personnel to ensure appropriate draft procedures for new product have been developed.
5. Trial new product through the process.	5.1 Design trialing procedure to deliver required information. 5.2 Ensure OHS and environmental requirements are stringently observed. 5.3 Coordinate the trialing of the new product. 5.4 Interpret product trial results and guide product trial process. 5.5 Tune process to optimise production of new product.
6. Determine process capability.	6.1 Plot appropriate statistical process control charts. 6.2 Determine 3 sigma confidence limits. 6.3 Compare confidence limits with product specification.
7. Coordinate product trials.	7.1 Determine product testing and evaluation regime

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	required to meet end use requirements, including regulatory/industry code requirements. 7.2 Arrange for testing and evaluation of trial product/prototype. 7.3 Interpret product trial results and guide product trial process. 7.4 Determine final product specification. 7.5 Make required changes to materials, process and equipment.
8. Implement standard procedures for new product.	8.1 Monitor initial production and adjust process, conditions and materials to make the process a smooth operation. 8.2 Ensure process specifications reflect the optimised operation developed. 8.3 Ensure standard operating procedures are correct for the new product. 8.4 Ensure equipment and other hardware records are updated to reflect additions/changes. 8.5 Ensure project records are complete and all required reports have been completed and submitted. 8.6 Archive records according to company procedure.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the materials, equipment and process sufficient to choose an appropriate combination of materials and process to achieve the end use function of the product.

Knowledge of organization procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Knowledge as a basis for solving processing and material problems including:

- polymer type and grade for a range of applications
- additives (including reinforcing) and grade for a range of applications

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- appropriate process for a range of product/market applications
- material and product testing procedures
- the impact of the polymerisation process on the polymer process
- appropriate polymer type and grade for typical applications
- appropriate additives and grades for a range of applications
- effects of processes and processing on the final properties of the product
- miscibility and solubility effects and phase separation/single phase processing
- mathematically determine
- volume fractions in a formula
- product cost estimates
- laboratory test results
- field test results
- market analysis data
- trialing data.

Language, literacy and numeracy requirements

This unit requires high levels of numeracy and literacy with the ability to write and interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The critical aspect for this unit of competency is the ability to apply a thorough understanding of polymer materials, their additives and the rheological, heat and other effects of processing to a new situation and use this understanding to predict likely solutions to the new product design specification challenge. This understanding of material and process interactions should also be able to be applied in interpreting data and making adjustments to materials and process to achieve the desired outcomes.

Assessment method and context

Assessment will occur using industrial products, situations and equipment using industrial polymers and will be undertaken in a work-like environment.

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Competence in this unit may be assessed:

- using appropriate, industrial product, situations and polymers
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
  - by using a suitable simulation and/or a range of case studies/scenarios
  - through a combination of these techniques.

The development must be of a product which is new to the organisation and not just a modification of an existing product. It is possible that a major redesign of an existing product may encompass all the aspects of a new product design to an appropriate breadth and depth. Where the only available product design projects are the major re-design of an existing project, normally several such projects will be required to match the breadth and depth of skills which can be demonstrated by the development of a totally new product

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

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This competency unit is for the design of a new product 'from scratch'. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. The competency assumes a working knowledge of all main processes and materials so that an informed choice can be made between them.

This unit requires an understanding of all standard processes, major polymer types and common additives.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include

- OHS
- food grade requirements
- environmental regulations
- PACIA packaging covenant
- structural codes.

Tools and equipment

This competency requires an understanding of the use of all standard processing equipment, It includes use of equipment and tools for:

- design of dies, such as are used in extrusion, injection moulding and blow moulding
- design of mould,s such as are used in rotational moulding and composites
- understanding
- relevant personal protection.

Appropriate factors

Appropriate factors include:

- type of material
- dimensional precision of product
- length of run/number of products
- required aesthetics
- size and complexity of product
- available capital funding
- process equipment available.

Problems

Typical process and product problems may include:

- defining product end use requirements in terms meaningful to the product design and manufacture
- matching suitable materials and processes to the product needs and company expertise and facilities

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- matching (and improving) process capability to product tolerances.
-

Unit Sector(s)

Not applicable.

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PMBTECH602B Develop a new die or tool

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the development of a new die or tool for a company and the facilitation of its initial use in production.

This competency is typically performed by high level staff, working as part of a die/tool design, development and implementation team and taking a lead technical role.

Application of the Unit

Application of this unit

This competency applies to people who develop new dies/tools to meet a specified end use. This will involve working closely with a range of management and operations personnel and toolmakers who will often be external to the company. It requires balancing the ease of use and process efficiency with tool/ die life and maintenance requirements. This unit of competency applies to the technical expert.

Critical aspects for success include:

- ensuring the technical performance meets the process and maintenance/reliability needs
- making sure the needs of cost, timeliness and quality are correctly balanced
- designing a die/tool which is efficient to use by the company
- liaising with the required people to ensure tooling design matches the product and process needs
- optimising the process for the new die/tool at the completion of the development phase.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has the prerequisites of:

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- *PMBTECH506B Analyse the design of products and tools*
- *MEM9.3B Prepare basic engineering drawing*
-

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Confirm die requirements.	1.1 Communicate with customer and other key stakeholders and agree on; product technical specification, product aesthetic requirements, timelines, cost, usage and other requirements. 1.2 Identify tool design/product design/process issues which may be in conflict and resolve. 1.3 Develop design brief, including relevant drawings, to meet needs. 1.4 Obtain 'sign off' on total design brief from all relevant persons.
2. Develop concept design specification of new die.	2.1 Select appropriate material(s) of construction or range of materials and grades. 2.2 Select appropriate finish requirements for die/tool. 2.3 Design die/tool using appropriate mathematical

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	techniques. 2.4 Validate die design specifications against die requirements and design brief.
3. Liaise with toolmaker on die manufacture.	3.1 Discuss design brief and concept design with tool maker(s). 3.2 Verify understanding of die/tool requirements and ability to meet requirements. 3.3 Negotiate contract to make die according to company policy and procedures. 3.4 Continue to liaise with toolmaker.
4. Trial new die and determine modification(s)(if any) required.	4.1 Design trialing procedure to deliver required information. 4.2 Ensure OHS and environmental requirements are stringently observed. 4.3 Coordinate the trialing of the new die/tool. 4.4 Interpret die/tool trial results and guide die trial process. 4.5 Tune process to optimise use of new die/tool.
5. Bring new die into standard production.	5.1 Monitor initial production and adjust die, process and conditions to make the process a smooth operation. 5.2 Ensure process specifications reflect the optimised operation developed. 5.3 Ensure standard operating procedures are correct for the new product. 5.4 Ensure equipment and other hardware records are updated to reflect additions/changes. 5.5 Ensure project records are complete and all required reports have been completed and submitted. 5.6 Archive records according to company procedure.

Required Skills and Knowledge

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This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the materials, equipment and process sufficient to design an efficient and effective die and to test that die in the process and validate its fitness for purpose.

Knowledge of organization policies and procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Knowledge as a basis for solving processing and material problems including:

- die material(s)
- die finish(s)
- the impact of the melt viscosity on die size and design
- runner/sprue design needed
- dies size and shape required to product required product
- Fourier analysis
- mould flow analysis
- shear stress/strain rates (viscosity)
- die design data
- production trial data.

Language, **literacy and numeracy requirements**

This unit requires high levels of numeracy and literacy with the ability to write and interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

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The critical aspects for this unit of competency is the ability to apply a thorough understanding of polymer materials, their additives and the rheological, heat and other effects of processing to the design of a new die/tool. The influence of die/tool design on the operability of the process and the properties of the product also need to be understood. The interpretation of die trial data and the modification of die and/or process to improve the outcome, are also critical.

Assessment method and context

Assessment will occur using industrial dies/tools and equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- using appropriate, industrial dies/tools and polymers
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
    - by using a suitable simulation and/or a range of case studies/scenarios
    - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

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Context

This competency unit is for the design of a new die or tool. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. The competency assumes a working knowledge of all main processes, polymer materials and materials of construction of dies/tools so that an informed choice can be made between them

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include:

- injection moulding
- extrusion
- blow moulding
- extrusion blow moulding
- injection blow moulding.

This competency includes the ability to mathematically design dies and analyse die trials. It also requires an understanding of the operation of the process equipment

Problems

Typical process and product problems may include:

- clarifying the design brief
- communication breakdowns between product designer, die designer, toolmaker and production and maintenance needs.
-

Unit Sector(s)

Not applicable.

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PMBTECH603B Design structural/mechanical polymer components

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the mechanical/structural design of components which are to be made from polymeric materials. It applies the traditional engineering structures to viscoelastic materials.

This competency is typically performed by senior technicians/technologists who are designing, or part of a team, designing polymeric structures or polymeric mechanical components.

Application of the Unit

Application of this unit

This competency applies to technologists designing new mechanical or structural components. The key factors in the design of the component are adequate strength and rigidity and making allowances for, and taking maximum advantage of, the inherent properties of polymeric materials.

It includes working with:

- structural components, such as support columns and beams in plastic playground equipment
- rigid beams and frames, such as in boat hulls and decks
- mechanical components, (such as gears, cams, etc) subject to forces/transmitting mechanical power
- a certified structural engineer (when appropriate) to provide specialised polymer knowledge.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

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This unit of competency has the prerequisite of *PMBTECH505B Choose polymer materials for an application.*

This unit of competency requires a detailed understanding of mechanics such as might be gained from some engineering studies. Where this knowledge is to be gained as part of this unit of competency, it will require a significantly greater effort and time than would otherwise be required.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Determine mechanical/ structural design requirements.	1.1 Determine stress/strain requirements of end use. 1.2 Determine flexural/rigidity requirements of end use. 1.3 Determine required physical properties (such as size, shape, density) of end use. 1.4 Determine environmental requirements (physical, chemical, radiation) of end product. 1.5 Identify how component fits with entire end product. 1.6 Develop mechanical design brief and verify with appropriate people.

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ELEMENT ELEMENT	**PERFORMANCE CRITERIA** Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
2. Select material(s) and additives, including reinforcing, appropriate for the design brief.	2.1 Select material/combination of materials with appropriate physical properties. 2.2 Select material/combination of materials with appropriate chemical properties. 2.3 Select material/combination of materials with appropriate radiation resistance properties. 2.4 Arrange for compounding and testing of possible material(s) as appropriate. 2.5 Determine relevant properties of selected material/shortlisted materials.
3. Undertake mechanical design of component.	3.1 Calculate size and shape/profile of component to meet design brief. 3.2 Liaise with product developer to also deliver required aesthetic aspects. 3.3 Liaise with product developer/production to ensure efficiency in manufacture. 3.4 Suggest modifications to material(s)/compound as required.
4. Design jointing/joining/ other product interfaces.	4.1 Liaise with designers of other components. 4.2 Agree on interface requirements/joints/joining as appropriate. 4.3 Design suitable interfaces. 4.4 Check interface design to ensure it meets the end use requirements without sacrificing integrity.
5. Finalise design.	5.1 Check internal consistency of design. 5.2 Check overall design meets end use requirements. 5.3 Write component specification. 5.4 Liaise with product developer/production to write production specification/procedures. 5.5 Supervise manufacture and testing of prototypes/manufacturing trials as appropriate. 5.6 Finalise specifications and manufacturing processes, complete all reports. 5.7 Ensure project records are complete and all required reports have been completed and submitted.

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ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	5.8 Archive records according to company procedure.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the materials, equipment and process sufficient to design a component which is mechanically/structurally fit for its end purpose and which can be efficiently manufactured.

Knowledge of organization policies and procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability for the practical completion of the job toapply and explain:

- stress/strain data of polymeric materials to the design situation
- material creep/viscoelasticity
- impact and notch strength
- tensile, compressive, shear and torsional strength
- tear strength
- adequate safety factors
- overall design features which take advantage of the polymeric material(s) being used.

Competence also includes the ability to make compounding recommendations to modify properties such as:

- stress/strain data of polymeric materials
- material creep/viscoelasticity, rheometric properties
- material strength
- environmental resistance (e.g. temperature, chemicals, UV
- and other radiation)
- make changes to physical size and shape to change:
- stiffness/rigidity, deflection
- strength.

Language, **literacy and numeracy requirements**

This unit requires high levels of numeracy and literacy with the ability to write and interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, design formulae and process conditions is also required.

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Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The critical aspect for this unit of competency is the ability to apply a thorough understanding of polymer materials, their additives and the rheological, heat and other effects of processing to the design of a new mechanical or structural component. The ability to modify both compound design and mechanical design to optimise the results should be evident. The designed product must not only be fit for its purpose but also capable of efficient manufacture for an appropriate price.

Assessment method and context

Assessment will occur using industrial situations and equipment using industrial polymers and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- using appropriate, industrial equipment, situations and polymers
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
    - by using a suitable simulation and/or a range of case studies/scenarios
    - through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

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This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency unit is for the design of a new product or a component of a new product which has a significant structural or mechanical requirement. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. The competency assumes a working knowledge of all main processes and polymer materials so that an informed choice can be made between them.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Unit Sector(s)

Not applicable.

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PMC554020D Design and prepare models, moulds and dies

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the design and preparation of models, moulds, and dies, and includes the preparation of cases and frames.

Application of the Unit

Application of the unit	This unit of competency applies to technicians or tradespeople who are responsible for determining the requirements for devices to be made from plans, specifications and schedules. Technicians are able to make the device from materials selected and adjust and check its dimensional accuracy. Often the devices are made from timber, but other materials, including sheet metal and fibreglass, for instance are possible. This unit of competency covers the making of moulds, models and dies for use in a variety of manufacturing operations, such as: • concrete products • clay products • ceramic products This unit was developed for larger production contexts but it may also be relevant to craft practitioners producing ceramic work. This competency is typically performed by an experienced technician, leading hand or supervisor.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Design and make models	1.1. Establish model design from drawings, originals or in consultation with the customer 1.2. Select and prepare appropriate materials for model construction 1.3. Make models ensuring the final product is to specification, and shrinkage is allowed for
2. Set up and produce block moulds	2.1. Select appropriate model to meet specification 2.2. Determine required sections and parting lines 2.3. Check mould meets occupational health and safety

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ELEMENT	PERFORMANCE CRITERIA
	(OHS) needs 2.4. Mix materials as required 2.5. Fill mould with mould material as required 2.6. Remove mould from model when required strength has been achieved 2.7. Finish mould to specifications and register correctly
3. Prepare cases and frames	3.1. Consult manufacturing schedule to determine type of mould to be made 3.2. Select appropriate frame or frames 3.3. Mix materials as required 3.4. Fill block mould 3.5. Remove block mould from the case and frame when required strength has been obtained 3.6. Register and date cases according to procedures 3.7. Prepare block mould for use
4. Prepare and make working moulds	4.1. Select the appropriate case/frame 4.2. Mix and pour mould material as required 4.3. Remove mould from model when required strength has been obtained 4.4. Finish and register moulds to procedures 4.5. Stack and dry moulds to procedures 4.6. Store moulds to procedures
5. Prepare dies	5.1. Consult manufacturing schedule to determine type of die to be made 5.2. Select and prepare required master die 5.3. Mix and pour die material as required 5.4. Remove die from master die when required strength has been obtained 5.5. Mark and finish dies to enterprise specifications 5.6. Cure and store dies to procedures
6. Respond to problems	6.1. Identify possible routine and non-routine problems in the equipment or process 6.2. Determine problems needing action 6.3. Determine possible fault causes 6.4. Rectify problem using appropriate solution within area of responsibility 6.5. Report problems outside area of responsibility to designated person

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- using and maintaining all required materials, tools and parts
- recognising situations which could cause production problems and taking appropriate action
- implementing enterprise's procedures and relevant regulatory requirements within appropriate time constraints and in a manner relevant to the operation of moulds and dies
- diagnosing and solving problems involved in the work
- predicting hazards that may arise from mould or die design or preparation
- communicating effectively with team members, management and other departments
- reading and numeracy to interpret workplace documents and technical information

Required knowledge

Required knowledge includes:

- specified quality standards
- characteristics of different materials
- requirements from drawings, specifications or job sheets
- distinguish between causes of faults such as:
  - materials
  - dimensions
  - allowance for shrinkage
  - damage to components

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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EVIDENCE GUIDE	
Overview of assessment	The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise situations requiring action and then in implementing appropriate corrective action. Consistent performance should be demonstrated. In particular look to see that: • OHS requirements are met • quality improvement techniques are applied • emergency procedures are understood and applied • waste is minimised.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation or case studies/scenarios may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual plant and will include 'walk-throughs' of the relevant competency components. A bank of scenarios/case studies/what ifs and questions will be required to probe the reasoning behind observable actions.
Method of assessment	This unit has no prerequisite competencies. Individual enterprises may choose to add prerequisites and co-requisites relevant to their processes.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different

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RANGE STATEMENT	
work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Procedures	All operations are performed in accordance with standard procedures and work instructions
Materials	Materials may include: • additives • body materials • epoxy resins • metal strapping • plaster • plastic • release agents • rubber • slip • timber • water
Equipment	Equipment may include: • block moulds and working moulds • cases and frames • hand and power tools • jigs and fixtures • master dies • mixing equipment • models • weighing equipment
OHS	The identification and control of hazards and the application of OHS are to be in accordance with current, applicable legislation and regulations, and company procedures. All operations are subject to stringent OHS requirements and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and OHS requirements, the OHS requirements take precedence

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Unit Sector(s)

Unit sector	Operational/technical

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMC554090B Undertake simple refractory design

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers applying design principles and undertaking simple design tasks. The technical requirements of the design are paramount and the application of an understanding of refractories, heat transfer and refractory wear and failure mechanisms are primary. The aesthetics of the design are of little if any significance.

Application of the Unit

Application of the unit	This unit of competency applies to technicians who are responsible for designing simple or small refractory installations or repairs. They apply the principles of heat transfer, thermal expansion, abrasion and structures along with a knowledge of refractory materials and installation techniques to the design to yield a product which will meet a rigid technical specification. This unit covers a refractory design for a situation which can be achieved by the application of standard products/components in a standard manner. It does not cover innovative products/ applications nor those situations where the design must be done by a registered engineer, although it may involve working with an engineer on a design This will typically be done by an individual technician working in liaison with customers, installers and technical experts.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Establish the suitability of resources	1.1. Check all information conforms with resources 1.2. Record discrepancies in information 1.3. Report any inaccuracies in information to the person in charge 1.4. Identify and select materials, components, tools and equipment
2. Undertake mechanical design	2.1. Determine strength requirements 2.2. Determine operating temperature range 2.3. Select materials/mix with appropriate mechanical

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ELEMENT	PERFORMANCE CRITERIA
	strength 2.4. Identify hazards of materials and processes to be used and apply hierarchy of control to control hazards 2.5. Determine expansion which will occur for this material 2.6. Adjust material/mix to be suitable for temperatures
3. Undertake thermal design	3.1. Determine heat flow through the refractory 3.2. Determine interface temperatures for multi-component linings 3.3. Use simple software 3.4. Determine interface bonding/anchor issues
4. Specify refractory design	4.1. Specify materials to be used 4.2. Specify installation method to be used 4.3. Confirm specification meets customer needs and installer requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • adjusting/correcting/responding to work requirements • identifying and resolving problems • using simple software for calculations • working in a team or individually, as required • reading and numeracy to interpret workplace documents and technical information
Required knowledge
Required knowledge includes: • heat flow calculations • awareness of other relationships involved with these calculations • refractory materials and their properties • refractory installation techniques

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REQUIRED SKILLS AND KNOWLEDGE
• structural strength of refractories • thermal expansion of refractories • methods of tying refractories

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the operation of all ancillary equipment to the level required for this unit of competency. Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. Consistent performance should be demonstrated. In particular look to see that: • the technical aspects of the design are identified and an appropriate solution is proposed.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation or case studies/scenarios may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual plant and will include 'walk-throughs' of the relevant competency components. A bank of scenarios/case studies/what ifs and questions will be required to probe the reasoning behind observable actions.

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EVIDENCE GUIDE	
Method of assessment	It may be appropriate to assess this unit concurrently with relevant teamwork and communication units. It may be appropriate to assess this unit concurrently with other relevant units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Procedures	All operations are performed in accordance with standard procedures and work instructions
Refractory materials	Refractory materials are those materials that have a resistance to temperature and include: • alumina silicate materials (clay) • silliminites • bauxite • synthetic aggregates • silica • magnesite • dolomite • chrome ores
Refractory installation techniques	Refractory installation techniques include: • bricks, blocks • mouldables • castable • spray/gunned application
Occupational health and safety	All operations are subject to stringent OHS

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RANGE STATEMENT	
(**OHS**)	requirements and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and OHS requirements, the OHS requirements take precedence

Unit Sector(s)

Unit sector	Operational/technical

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMC554091B Analyse refractory failures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers analysing a refractory failure to determine failure mode. It involves understanding failure modes, differentiating different modes and understanding forensic procedures.

Application of the Unit

Application of the unit	Refractories may fail due to a number of reasons, and these may be mechanical (wear, impact) or thermal (thermal stresses, flame impingement) or due to other reasons. The analysis of failures is important so that replacement refractories can be better designed to reduce this failure and extend the time between failure/ replacement. This unit covers all common types of refractory failures. The failure needs to be recognised and distinguished from other possible causes. Possible causes for the failure also need to be identified particularly if failure is unexpected/refractory life is shorter than expected This unit would typically be undertaken by a technician working either alone or in liaison with another refractory expert.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Establish the suitability of resources	1.1. Check all information conforms with resources 1.2. Record discrepancies in information 1.3. Report any inaccuracies in information to the person in charge 1.4. Identify and select materials, components, tools and equipment
2. Analyse failure modes	2.1. Identify spalling modes 2.2. Identify corrosion mode 2.3. Identify abrasion modes 2.4. Identify impact/compression/tensile modes
3. Undertake forensic procedures	3.1. Plan required investigation 3.2. Specify required testwork/analyses

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ELEMENT	PERFORMANCE CRITERIA
	3.3. Interpret test results 3.4. Formulate simple reports

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • observing workplace procedures • identify and solving problems • working in a team or individually, as required • reading and numeracy to interpret workplace documents and technical information
Required knowledge
Required knowledge includes: • basis of various failure modes • organisation of simple testwork programs • make appropriate judgements on results • reporting results in report format

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective

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EVIDENCE GUIDE	
	action. Consistent performance should be demonstrated. In particular look to see that: • investigation of a failure is undertaken and an evidence based conclusion as to the failure mode is developed.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation or case studies/scenarios may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual plant and will include 'walk-throughs' of the relevant competency components. A bank of scenarios/case studies/what ifs and questions will be required to probe the reasoning behind observable actions.
Method of assessment	It may be appropriate to assess this unit concurrently with relevant teamwork and communication units. It may be appropriate to assess this unit concurrently with other relevant units. Where the analysis of refractory failure is to occur on-site or in a vessel then competency in the appropriate OHS and/or permit units is also required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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RANGE STATEMENT	
situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Procedures	All operations are performed in accordance with standard procedures and work instructions
Investigation	Investigation involves: • the collection of evidence, and may require the specifying of appropriate tests and the analysis of plant records and logs
Reports	The report should summarise: • the nature of the failure • the cause • the methods used to determine this cause • conclusions drawn and recommendations made
Occupational health and safety (**OHS**)	All operations are subject to stringent OHS requirements and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and OHS requirements, the OHS requirements take precedence

Unit Sector(s)

Unit sector	Operational/technical

Competency field

Competency field	

Co-requisite units

Co-requisite units	

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Co-requisite units		

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PSPGOV408A Value diversity

Modification History

Release	TP Version	Comments
3	PSP12V1	Unit descriptor edited.
2	PSP04V4.2	Layout adjusted. No changes to content.
1	PSP04V4.1	Primary release.

Unit Descriptor

This unit covers promotion of the value of workplace diversity and the contribution it makes to effective work practices, the generation of new ideas, and the organisation's responsiveness to the community. It includes promoting the benefits of workplace diversity and contributing to diversity outcomes.

In practice, diversity is promoted in the context of other generalist or specialist work activities such as upholding and supporting public service values, providing input to change, contributing to policy development and implementation, delivering client services, managing contracts, etc.

This is one of 6 units of competency in the Competency Fields of *Working in Government* and *Management* that deal with diversity. Related units are:

- PSPGOV201B Work in a public sector environment
- PSPGOV308B Work effectively with diversity
- PSPGOV505A Promote diversity
- PSPMNGT605B Manage diversity
- PSPMNGT702A Influence and shape diversity management
-
- No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication

Application of the Unit

Not applicable.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements are the essential outcomes of the unit of competency.	Together, performance criteria specify the requirements for competent performance. Text in ***bold italics*** is explained in the Range Statement following.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Promote the benefits of diversity	1.1 The ***diversity*** of the workgroup is analysed to identify the strengths and differences that benefit both staff and the organisation. 1.2 ***Workplace diversity issues, benefits*** and risks are explained to others using language and supporting material suitable to their needs and the situations they are likely to experience. 1.3 Diversity training and awareness programs are identified and ***promoted*** to encourage and support others to appreciate the benefits of diversity. 1.4 Opportunities for leadership in, and advocacy of, workplace diversity are identified and utilised within own area of responsibility.
2. Contribute to diversity outcomes	2.1 Currency is maintained in knowledge of diversity principles and practices that are applied in the workplace. 2.2 Others are assisted to access and use ***legislation, policy and guidelines*** to ensure work practices contribute to diversity benefits. 2.3 Development and use of a range of ***communication styles*** is modelled and fostered to respond to the diversity of the workplace and its clients.

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ELEMENT	PERFORMANCE CRITERIA
	2.4 Targeted responses to the needs of the organisation's diverse client group/s are identified and implemented in accordance with organisational policy and procedures.
	2.5 Feedback on diversity policies, strategies and practices/services is provided to managers in accordance with organisational procedures.

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Skill requirements

Look for evidence that confirms skills in:

- applying legislation, regulations, policies, procedures and guidelines relating to/impacting on workplace diversity, such as equal employment opportunity, anti-discrimination
- using a range of communication styles to suit different audiences and purposes
- communicating with people from diverse backgrounds
- delivering services/responding to the needs of diverse client groups
- responding to workplace diversity, including gender and disability
- identifying racist behaviours
- explaining complex and formal documents such as legislation and codes of conduct and applying them to work practices
- actively demonstrating to others a clear commitment to the principles and practices of workplace diversity

Knowledge requirements

Look for evidence that confirms knowledge and understanding of:

- complexities of cultural diversity, including issues of racism, discrimination, harassment and victimisation
- direct versus indirect discrimination
- public sector definitions of diversity
- issues and benefits relating to workplace diversity
- equal employment opportunity, equity and diversity principles
- principles and practices of cultural awareness
- avoidance of gender bias in language
- principles of multiculturalism
- productive diversity principles including flexibility, multiplicity, devolution, negotiation and pluralism

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- institutional racism and resulting indirect discrimination
- public sector values and codes of conduct
- jurisdictional legislation, instructions, directions and standards that underpin or impact on workplace diversity
- public sector policies, practices and procedures related to diversity, including those related to the provision of language services

Evidence Guide

The Evidence Guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the Unit descriptor, Performance Criteria, the Range Statement and the Assessment Guidelines for the Public Sector Training Package.

Units to be assessed together

- *Pre-requisite* units that must be achieved prior to this unit:*Nil*
- *Co-requisite* units that must be assessed with this unit:*Nil*
- *Co-assessed units* that may be assessed with this unit to increase the efficiency and realism of the assessment process include, but are not limited to:
  - PSPETHC401A Uphold and support the values and principles of public service
  - PSPLEGN401A Encourage compliance with legislation in the public sector
  - PSPGOV402B Deliver and monitor service to clients
  - PSPGOV411A Deal with conflict
  - PSPGOV412A Use advanced workplace communication strategies
  - PSPGOV414A Provide workplace mentoring
  - PSPGOV418A Develop internal and external networks
  - PSPGOV419A Work with interpreters
  - PSPPOL404A Support policy implementation

Overview of evidence requirements

In addition to integrated demonstration of the elements and their related performance criteria, look for evidence that confirms:

- the knowledge requirements of this unit
- the skill requirements of this unit
- application of Employability Skills as they relate to this unit
- valuing diversity in a range of (3 or more) contexts (or occasions, over time) such as upholding and supporting public service values, providing input to change, contributing to policy development and implementation, administering contracts

Resources required to

These resources include:

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carry out assessment	• definition and benefits of workplace diversity • statistics on community diversity • public sector values and codes of conduct • organisational procedures and protocols • legislation, regulations, policies, procedures and guidelines relating to/impacting on workplace diversity
Where and how to assess evidence	Valid assessment of this unit requires: • a workplace environment or one that closely resembles normal work practice and replicates the range of conditions likely to be encountered, including coping with difficulties, irregularities and breakdowns in routine • valuing diversity in a range of (3 or more) contexts (or occasions, over time) such as upholding and supporting public service values, providing input to change, contributing to policy development and implementation, administering contracts. Assessment methods should reflect workplace demands, such as literacy, and the needs of particular groups, such as: • people with disabilities • people from culturally and linguistically diverse backgrounds • Aboriginal and Torres Strait Islander people • women • young people • older people • people in rural and remote locations. Assessment methods suitable for valid and reliable assessment of this competency may include, but are not limited to, a combination of 2 or more of: • case studies • demonstration • observation • portfolios • projects • questioning • scenarios • simulation or role plays • authenticated evidence from the workplace and/or training
For consistency of assessment	Evidence must be gathered over time in a range of contexts to ensure the person can achieve the unit outcome and apply the competency in different situations or environments

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Range Statement

The Range Statement provides information about the context in which the unit of competency is carried out. The variables cater for differences between States and Territories and the Commonwealth, and between organisations and workplaces. They allow for different work requirements, work practices and knowledge. The Range Statement also provides a focus for assessment. It relates to the unit as a whole. Text in ***bold italics*** in the Performance Criteria is explained here.	
Diversity may include:	• age • cultural background • educational level • ethnicity • expertise • family responsibilities • gender • interests • interpersonal approach • language • life experience • marital status • not fitting the dominant paradigm of the organisation • personality • physical ability • political orientation • religious belief • sexual orientation • socio-economic background • thinking/learning styles • work experience • working styles

Workplace diversity issues may include:	• equal employment opportunity issues such as:
	  • direct and indirect discrimination - discriminatory systems and practices
	  • harassment
	  • racism
	  • under-representation of equity groups in the public sector
	  • employment of equity groups concentrated at lower levels in the public sector
	  • women making up more than half of the public sector workforce but disproportionately represented at lower salary levels
	  • barrier (or glass ceiling) that prevents equity group members

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	progressing to higher salary levels • disproportionate representation of equity group members in non-permanent, casual or contract positions • inappropriate supervisory treatment of equity group members • culturally inappropriate workplaces • enabling access to buildings to people with a disability • making reasonable adjustment to work processes. • quality of service delivery to clients from diverse backgrounds • sidelining staff from diverse backgrounds to 'diversity roles' rather than the opportunity to pursue what interests them, or where they add most value • people from recognised diversity groups choosing not to be identified through usual statistical collection methods • workplace systems or practices that don't allow a balance between work and family responsibilities • inequitable access to acting opportunities, workplace training and development • questioning/disregarding the dominant paradigm of the organisation • inappropriate treatment of those who don't fit the dominant paradigm of the organisation • risks associated with diversity not managed • different values: • uncertainty avoidance • collectivist/individualist • power/distance • masculine/feminine • resolving communication issues • developing cultural competence • negotiating commonalities • resolving conflict • negotiating difference
Benefits of diversity may include:	• improved client service - internal and external • improved service delivery • promotion of equity and fairness • improved access for clients from diverse backgrounds to government services and programs • improved relationship with the community • wider sources of recruitment • greater responsiveness to change • cultural enrichment

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	• promotion of creativity • creation of a harmonious and supportive work environment • retention of staff • facilitation of attainment of organisation goals • increased skills and experience added to the workplace • a workforce representative of the client base • a balanced workforce in terms of age, gender, race and culture
Promotion of training and awareness programs may include:	• word of mouth • memos • emails • flyers • intranet

Legislation, ***policy and guidelines*** may include:	• Commonwealth and State/Territory legislation addressing diversity issues for example:
	  • Racial Discrimination Act 1975
	  • Sex Discrimination Act 1984
	  • Disability Discrimination Act 1992
	  • Workplace Relations Act 1996
	  • Privacy Act 1988
	  • Human Rights and Equal Opportunity Commission Act 1984
	  • Equal Opportunity for Women in the Workplace Act 1999.
	• public service/public sector management acts
	• workplace diversity guidelines/program
	• national and international codes of practice and standards
	• the organisation's plans, strategies and policies relating to diversity
	• policies relating to language services
	• government policy mandating equal employment opportunity and/or workplace diversity requirements, such as:
	  • Managing diversity in the Western Australian public sector, August 1995
	  • Valuing cultural diversity, State of Victoria, 2002.
	• public sector ethics/values/codes of conduct
	• public sector management standards (subordinate law)
	• Commissioner's directions/instructions
	• community guidelines, policy and practices (such as those within Aboriginal and Torres Strait Islander communities)

Communication styles may include:	• plain English • language in active rather than passive voice • simple sentence structure even though content may be complex

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	• lack of jargon and acronyms • culturally appropriate body language • oral or written • use of graphics and illustrations • use of colour • reader-friendly layout • effective paragraphing • different languages • interpreting and translating • use of different media e.g. online

Unit Sector(s)

Not applicable.

Competency field

Working in Government.

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PSPPM402B Manage simple projects

Modification History

Release	TP Version	Comments
3	PSP12V1	Unit descriptor edited.
2	PSP04V4.2.	Layout adjusted. No changes to content.
1	PSP04V4.1	Primary release.

Unit Descriptor

This unit covers management of generally low risk projects that may be small scale and managed by one person or a person with a small team. It includes implementing project start-up activities, coordinating project implementation, monitoring the project and arranging follow-up activities. Contract management requirements are not included as this aspect is addressed by units of competency within the Competency field of *Procurement and Contract Management*.

In practice, managing simple projects overlaps with other generalist and specialist work activities such as applying government processes, using resources, gathering information, managing contracts etc.

This unit, and unit *PSPPM405A Administer simple projects*, are mutually exclusive. One or the other, but not both, may contribute to a qualification.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication

Application of the Unit

Not applicable.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements are the essential outcomes of the unit of competency.	Together, performance criteria specify the requirements for competent performance. Text in ***bold italics*** is explained in the Range Statement following.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. **Implement start-up activities**	1.1 The ***project plan*** is updated with confirmed information for key dates and activities, resources and project governance details in accordance with the project implementation strategy. 1.2 Project ***stakeholders'*** understanding of and agreement to fulfil the project requirements and their roles and responsibilities are confirmed. 1.3 ***Required systems*** are established and maintained throughout the project in accordance with the project plan. 1.4 A working knowledge of ***project management tools*** is used to facilitate integration of project activities and achievement of project outcomes.
2. **Coordinate project implementation**	2.1 ***Integration*** and ***management*** of project activities are handled in accordance with the project plan. 2.2 Stakeholder input and expectations are managed and their commitment is maintained throughout the life of the project in accordance with organisational policy and procedures and the project plan. 2.3 Disagreements and disputes are resolved or referred to a higher authority in accordance with organisational policy and procedures. 2.4 Project ***change proposals*** are received and changes are recommended/made in accordance with the project plan, and documented in accordance with ***policy and procedures***.
3. **Monitor project**	3.1 All aspects of the project are continually monitored and

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ELEMENT	PERFORMANCE CRITERIA
	corrective action is taken as necessary to maintain progress in accordance with the project plan.
	3.2 Consultation and reporting mechanisms are applied in accordance with the communication plan when dealing with management, staff and/or contractors, steering committee members or other stakeholders.
	3.3 Project governance plans and any related contracts are monitored, reviewed and amended as appropriate, and results are reported in accordance with the communication plan.
	3.4 Project progress is monitored against agreed milestones in accordance with the project plan to provide a measure of performance throughout the life of the contract.
	3.5 Programmed review of objectives and achievement is implemented in accordance with the project plan.
4. Arrange project follow-up activities	4.1 Project deliverables are analysed against ***specifications***, performance standards and project objectives, under broad guidance, and the results are reported to stakeholders.
	4.2 An initial support package or product manual is produced, if required, to provide guidance for stakeholders who will be required to apply the project results.
	4.3 The support package includes options for stakeholders to take account of environmental and cultural factors in applying project results.
	4.4 Operational and support authorities are consulted to research any testing/trialling/building requirements resulting from the project, and evaluation of any recommendations are included in the project report.

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Skill requirements

Look for evidence that confirms skills in:

- leading and mentoring people to achieve project deliverables
- maintaining agreement of stakeholders and team members to timelines, roles and responsibilities
- communicating with stakeholders and team members using a range of communication styles to suit different audiences and purposes

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- responding to diversity, including gender and disability
- using project management tools applicable to small scale or low risk projects
- applying ethical decision making and problem solving related to project management of small scale or low risk projects
- writing recommendations and preparing implementation support packages requiring precision of expression
- applying workplace safety procedures in line with project requirements
- accessing/preparing information electronically or in hard copy

Knowledge requirements

Look for evidence that confirms knowledge and understanding of:

- legislation, organisational policies and procedures that may impact on project management, for example:
  - public sector codes of ethics/conduct
  - occupational health and safety and environment requirements
  - project governance requirements
  - quality standards
- risk management
- procurement guidelines
- human resources
- equal employment opportunity, equity and diversity principles
- project management tools to suit a range of small scale or low risk projects
- project management principles
- organisational and political context

Evidence Guide

The Evidence Guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the Unit descriptor, Performance Criteria, the Range Statement and the Assessment Guidelines for the Public Sector Training Package.

Units to be assessed together

- *Pre-requisite* units that must be achieved prior to this unit:*Nil*
- *Co-requisite* units that must be assessed with this unit:*Nil*
- *Co-assessed units* that may be assessed with this unit to increase the efficiency and realism of the assessment process include, but are not limited to:
  - PSPETHC401A Uphold and support the values and principles of public service
  - PSPGOV402B Deliver and monitor service to clients

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- PSPGOV403B Use resources to achieve work unit goals
- PSPGOV411A Deal with conflict
- PSPGOV412A Use advanced workplace communication strategies
- PSPGOV422A Apply government processes
- PSPLEGN401A Encourage compliance with legislation in the public sector
- PSPPROC410A Administer contracts
- PSPPM401B Design simple projects
- PSPPM403B Close simple projects

- *Excluded units* that may not contribute to the same qualification as this unit:
  - PSPPM405A Administer simple projects

Overview of evidence requirements

In addition to integrated demonstration of the elements and their related performance criteria, look for evidence that confirms:

- the knowledge requirements of this unit
- the skill requirements of this unit
- application of the Employability Skills as they relate to this unit (see Employability Summaries in Qualifications Framework)
- simple projects managed in a range of (3 or more) contexts (or occasions, over time)

Resources required to carry out assessment

These resources include:

- legislation, guidelines, procedures and protocols relating to project management
- workplace project documentation
- scenarios and case studies
- examples of project management tools

Where and how to assess evidence

Valid assessment of this unit requires:

- a workplace environment or one that closely resembles normal work practice and replicates the range of conditions likely to be encountered when implementing projects, including coping with difficulties, irregularities and breakdowns in routine
- simple projects managed in a range of (3 or more) contexts (or occasions, over time)

Assessment methods should reflect workplace demands, such as literacy, and the needs of particular groups, such as:

- people with disabilities
- people from culturally and linguistically diverse

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backgrounds
- Aboriginal and Torres Strait Islander people
- women
- young people
- older people
- people in rural and remote locations

Assessment methods suitable for valid and reliable assessment of this competency may include, but are not limited to, a combination of 2 or more of:

- case studies
- demonstration
- portfolios
- questioning
- scenarios
- authenticated evidence from the workplace and/or training courses

For consistency of assessment

Evidence must be gathered over time in a range of contexts to ensure the person can achieve the unit outcome and apply the competency in different situations or environments

Range Statement

The Range Statement provides information about the context in which the unit of competency is carried out. The variables cater for differences between States and Territories and the Commonwealth, and between organisations and workplaces. They allow for different work requirements, work practices and knowledge. The Range Statement also provides a focus for assessment. It relates to the unit as a whole. Text in ***bold italics*** in the Performance Criteria is explained here.

Project plan will include some or all of:

- acquisition strategies
- budget and financial management strategy
- contract management
- cost estimates
- evaluation criteria
- expected outcomes/measurable benefits of the project
- facilities
- inclusions and exclusions from project
- information/communication strategy
- intellectual property strategies
- milestones

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- objectives
- outputs/project deliverables and their acceptance criteria
- people plan including human resource management and human resource development
- performance criteria/indicators
- project control mechanisms
- project implementation strategy
- project governance strategy
- purpose
- quality assurance
- quality control
- quality standards for project
- rationale
- required project resources
- resource management
- risk management
- roles and responsibilities
- schedule/timeline
- task/work breakdown structure (WBS)

Stakeholders may include:

- project sponsor/funding bodies
- clients or customers (internal and external)
- industry
- other agencies
- general public
- relevant interest groups
- unions
- functional areas
- the organisation's senior management
- Ministers
- project team
- steering committee members
- end user
- supplier/service provider

Required systems for project management may include:

- planning and monitoring system
- financial management including:
  - budget allocation/funding
  - income generated
  - expenditure
- recordkeeping for documented information such as:

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- correspondence
- quality data including survey, needs, test results
- contracts
- time allocated and spent on each aspect of the project
- progress reports
- performance reports against milestones
- project outcomes
- samples, prototypes, models

Project management tools may include:

- risk analysis
- organisational project governance framework
- communications plan
- reporting framework
- project management software and other tools:
  - Gantt and bar charts
  - Program Evaluation and Review Technique (PERT) charts
  - Critical Path Method
  - cost schedule control system
  - logistics support analysis
  - life cycle cost analysis
  - spreadsheets
  - recording systems - electronic and manual

Integration of project activities may include:

- scope
- time
- cost
- quality
- human resources
- communications
- risk
- procurement

Management may include:

- scope management
- communication and reporting
- schedule management
- financial management
- quality management
- resources management
- people management
- logistics management
- risk management

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	• contract management • change management
Change proposals may include:	• scope • administration • engineering, technical, technology changes • time • cost • resources

Policy and procedures may include:	• government legislation (Federal, State and Local) affecting organisation's administration such as:
	  • public sector management acts
	  • financial management and accounting legislation and regulations
	  • privacy legislation
	• government and organisational guidelines and procedures relating to:
	  • project governance
	  • resourcing
	  • security
	  • strategic plans
	  • recruitment
	  • risk management
	  • procurement guidelines
	  • designation approvals
	  • industrial agreements

Specifications may include:	• functional • technical • performance • material

Unit Sector(s)

Not applicable.

Competency field

Project Management.

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PSPPM501B Design complex projects

Modification History

Release	TP Version	Comments
3	PSP12V1	Unit descriptor edited.
2	PSP04V4.2.	Layout adjusted. No changes to content.
1	PSP04V4.1	Primary release.

Unit Descriptor

This unit covers planning and development of projects which may be reasonably complex in terms of scope, degree of risk, political, cultural and social factors that apply, consequences of failure and degree of control of the projects. It includes identifying project opportunities, undertaking scoping, analysing the feasibility of projects, developing project plans and managing the establishment of projects. Contract management requirements are not included as this aspect is addressed by units of competency within the Competency field of *Procurement and Contract Management*.

In practice, designing complex projects overlaps with other generalist and specialist work activities such as acting ethically, coordinating resource allocation and usage, developing client services, undertaking research and analysis.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication

Application of the Unit

Not applicable.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements are the essential outcomes of the unit of competency.	Together, performance criteria specify the requirements for competent performance. Text in ***bold italics*** is explained in the Range Statement following.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify project opportunities and undertake scoping	1.1 A ***critical analysis*** of the need for a project is conducted in accordance with organisational ***policy and procedures***. 1.2 A project definition study is undertaken, where necessary, to determine the scope of the project. 1.3 Project scoping is completed in accordance with organisational policy and procedures and identifies a rationale for the project that includes the purpose, outcomes/expected benefits. 1.4 ***Stakeholders*** are identified and canvassed to ensure that their requirements are addressed in project planning.
2. Analyse project feasibility	2.1 Research and analysis is undertaken to identify impacts and risks, ***constraining factors*** and alternate options. 2.2 Technical feasibility, supportability and cost effectiveness of the project are analysed and the outcome is reported to key stakeholders. 2.3 Alternatives for project design are assessed and a preferred option that fits the strategic direction of the organisation/work unit is identified and reported. 2.4 Relevant specialists are consulted to determine the extent of financial, technical, security, scheduling, ***whole-of-life support*** and probity, and other risks. 2.5 A business case is prepared and ***approvals*** to proceed with project development are obtained in accordance with organisational policy, procedures and guidelines.
3. Develop project	3.1 Project aims, objectives and impacts are defined in the ***project***

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ELEMENT	PERFORMANCE CRITERIA
plans	***plan***, and timeframes and resources to complete quality deliverables on time and within budget are identified. 3.2 Projected outcomes are recorded in measurable and achievable forms and indicators to monitor the performance of the project are developed and agreed by relevant parties. 3.3 Potential risks are investigated and identified in the project plan and a risk management process is established to analyse information and options to ***manage risks***. 3.4 Skills, roles and responsibilities of team members and stakeholders are clarified and agreed, and reporting requirements are identified. 3.5 ***Management*** of ***project parameters*** is addressed in the project plan and evaluation criteria are designed in accordance with organisational policy and practice. 3.6 ***Project management tools*** are utilised for planning in accordance with project requirements and the project is designed and ***documented*** in consultation with ***specialists*** to meet user requirements.
4. Manage establishment of project	4.1 If required, stakeholders are lobbied in accordance with organisational policy and procedures, to negotiate endorsement for the project. 4.2 Terms of reference are written and agreed to by stakeholders and resources are obtained in accordance with organisational procedures to establish the project. 4.3 Project scope and objectives are reviewed and analysed, and a strategy is developed to establish ***work breakdown structures*** to implement the project. 4.4 Project ***infrastructure*** is identified and established in accordance with organisational policy and procedures. 4.5 Specialist and technical support relevant to the project is obtained in accordance with the project plan. 4.6 Project governance structure and processes are established as detailed in the project plan.

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Skill requirements

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Look for evidence that confirms skills in:

- using project planning techniques related to projects that may be reasonably complex in terms of scope, degree of risk, political, cultural and social factors that apply, consequences of failure and degree of control of the projects
- detailing requirements, writing recommendations and preparing plans requiring precision of expression
- negotiating timelines, roles and responsibilities with stakeholders and team members
- scheduling project activities
- communicating with stakeholders using a range of communication styles to suit different audiences and purposes
- responding to diversity, including gender and disability
- using project management tools suited to planning reasonably complex projects
- applying risk management techniques in project establishment including risk sharing and transfer
- using public relations strategies to promote and gain endorsement for projects
- including workplace safety issues in project planning requirements
- accessing/preparing information electronically or in hard copy

Knowledge requirements

Look for evidence that confirms knowledge and understanding of:

- legislation, organisational policies and procedures that may impact on the project and management of the project, for example:
  - public sector codes of ethics/conduct
  - occupational health and safety and environmental and sustainability requirements
- project governance requirements
- financial management requirements
- quality standards
- risk management
- procurement
- human resources
- equal employment opportunity, equity and diversity principles
- project planning methods which may be reasonably complex in terms of scope, degree of risk, political, cultural and social factors that apply, consequences of failure and degree of control of the projects
- project management tools suited to planning reasonably complex projects
- principles relating to the planning phase of project management
- the project specifications
- market capability
- resource plans

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- project approval processes
- scheduling packages
- cost schedule control systems
- integrated logistics support
- work breakdown structures
- change management in the context of designing complex projects

Evidence Guide

The Evidence Guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the Unit descriptor, Performance Criteria, the Range Statement and the Assessment Guidelines for the Public Sector Training Package.

Units to be assessed together

- *Pre-requisite* units that must be achieved prior to this unit:*Nil*
- *Co-requisite* units that must be assessed with this unit:*Nil*
- *Co-assessed units* that may be assessed with this unit to increase the efficiency and realism of the assessment process include, but are not limited to:
  - PSPETHC501B Promote the values and ethos of public service
  - PSPGOV502B Develop client services
  - PSPGOV503B Coordinate resource allocation and usage
  - PSPGOV504B Undertake research and analysis
  - PSPGOV505A Promote diversity
  - PSPGOV507A Undertake negotiations
  - PSPGOV512A Use complex workplace communication strategies
  - PSPPM502B Manage complex projects
  - PSPPM503B Close complex projects
  - PSPPROC502A Establish contract management arrangements

Overview of evidence requirements

In addition to integrated demonstration of the elements and their related performance criteria, look for evidence that confirms:

- the knowledge requirements of this unit
- the skill requirements of this unit
- application of the Employability Skills as they relate to this unit (see table Following for examples)
- complex projects designed in a range of (3 or more)

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contexts (or occasions, over time)

Resources required to carry out assessment

These resources include:

- legislation, guidelines, procedures and protocols relating to project planning and management
- workplace project documentation
- scenarios and case studies
- examples of project management tools

Where and how to assess evidence

Valid assessment of this unit requires:

- a workplace environment or one that closely resembles normal work practice and replicates the range of conditions likely to be encountered when initiating projects, including coping with difficulties, irregularities and breakdowns in routine
- complex projects designed in a range of (3 or more) contexts (or occasions, over time)

Assessment methods should reflect workplace demands, such as literacy, and the needs of particular groups, such as:

- people with disabilities
- people from culturally and linguistically diverse backgrounds
- Aboriginal and Torres Strait Islander people
- women
- young people
- older people
- people in rural and remote locations

Assessment methods suitable for valid and reliable assessment of this competency may include, but are not limited to, a combination of 2 or more of:

- case studies
- demonstration
- observation
- portfolios
- projects
- questioning
- scenarios
- simulation or role plays
- authenticated evidence from the workplace and/or training courses

For consistency of

Evidence must be gathered over time in a range of contexts to ensure the person can achieve the unit outcome and apply the

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assessment	competency in different situations or environments

Range Statement

The Range Statement provides information about the context in which the unit of competency is carried out. The variables cater for differences between States and Territories and the Commonwealth, and between organisations and workplaces. They allow for different work requirements, work practices and knowledge. The Range Statement also provides a focus for assessment. It relates to the unit as a whole. Text in ***bold italics*** in the Performance Criteria is explained here.

Critical analysis may include:	• internal and external environment scan • political imperatives • previous and current related projects • policies likely to be impacted • cost-benefit analysis

Policy and procedures may include:	• government legislation (Federal, State and Local) affecting organisation's administration such as:
	  • public sector management acts
	  • financial management and accounting legislation and regulations
	  • privacy legislation
	  • environmental/sustainability legislation
	• government and organisational guidelines and procedures relating to:
	  • project governance
	  • resourcing
	  • security
	  • strategic plans
	  • recruitment
	  • risk management
	  • procurement guidelines
	  • designation approvals
	  • industrial agreements

Stakeholders may include:	• project sponsor/funding bodies • clients or customers (internal and external) • industry • other agencies • general public • relevant interest groups

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- unions
- functional areas
- the organisation's senior management
- Ministers
- project team
- steering committee members
- end user
- supplier/service provider

Constraining factors may include:

- political
- industrial
- legislative
- technical
- financial
- social
- cultural
- security/privacy
- environmental
- logistical support
- resources

Whole-of-life support may include:

- maintenance
- supply
- technical data
- personnel
- training
- facilities
- packaging, handling
- storage and transportation
- support and test equipment
- computing support

Approval may be required from:

- project sponsor
- business owner of the project
- program manager
- line manager
- specialist project management office
- chief executive officer, manager or management representative
- funding body
- customer or client

Project plan will include

- acquisition strategies

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some or all of:	• budget and financial management strategy • contract management • cost estimates • evaluation criteria • expected outcomes/measurable benefits of the project • facilities • inclusions and exclusions from project • information/communication strategy • intellectual property strategies • milestones • objectives • outputs/project deliverables and their acceptance criteria • people plan including human resource management and human resource development • performance criteria/indicators • project control mechanisms • project implementation strategy • project governance strategy • purpose • quality assurance • quality control • quality standards for project • rationale • required project resources • resource management • risk management • roles and responsibilities • schedule/timeline • task/work breakdown structure (WBS)
Risk management may include:	• acceptance • avoidance • minimisation • transfer
Management may include:	• risk management • schedule management • financial management • communication, including reporting • resources management • logistics management

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- scope management
- change management
- quality management
- people management
- procurement management
- occupational health and safety management

Project parameters include:

- project scope - outcomes, objectives, project deliverables
- feasibility
- skills required for project team
- people required for project including specialist expertise
- communications including reporting requirements
- risks associated with project including people, environment, resources, technology change during the life of the project, if applicable
- steering committee arrangements
- timeframe and milestones
- cost
- resources for project
- acquisition/procurement
- organisational structure for project
- project quality control and operational flexibility
- project governance structure
- monitoring through staged rollout
- project delivery requirements
- pilot outcomes
- intellectual property
- integration of project within organisation
- transition arrangements
- change management
- project evaluation

Project management tools may include:

- risk analysis
- organisational project governance framework
- communications plan
- reporting framework
- project management software and other tools:
  - Gantt and bar charts
  - Program Evaluation and Review Technique (PERT) charts
  - Critical Path Method
  - cost schedule control system

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- logistics support analysis
- life cycle cost analysis
- spreadsheets
- recording systems - electronic and manual

Documented information may include:

- reports detailing strategy
- statement of requirement/work
- industry development proposals
- project plans
- resource plans
- project team work plans
- risk and issues plan and log
- performance evaluation criteria
- reports to industry
- whole-of-life support proposals
- project definition study

Relevant specialists may include:

- legal
- technical
- financial
- other functional areas
- other relevant agencies
- logistics

Work breakdown structures may include:

- how the work is to be performed and how cost and schedule data are to be tracked and reported
- identification of the project tasks (deliverables)
- identification of specific management responsibilities for tasks

Project infrastructure may include:

- staffing levels/need for recruitment action and training
- equipment and technical support
- resource requirements including travel, finance etc
- project office accommodation
- management infrastructure

Unit Sector(s)

Not applicable.

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Competency field

Project Management.

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PSPPM502B Manage complex projects

Modification History

Release	TP Version	Comments
3	PSP12V1	Unit descriptor edited.
2	PSP04V4.2.	Layout adjusted. No changes to content.
1	PSP04V4.1	Primary release.

Unit Descriptor

This unit covers management of projects that may be reasonably complex in terms of scope, degree of risk, political, cultural and social factors that apply, consequences of failure and degree of control of the projects. It includes managing start-up, project implementation, project integration and follow-up activities. Contract management requirements are not included as this aspect is addressed by units of competency within the Competency field of *Procurement and Contract Management*.

In practice, managing complex projects overlaps with other generalist and specialist work activities such as acting ethically, coordinating resource allocation and usage, developing client services, undertaking research and analysis.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication

Application of the Unit

Not applicable.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements are the essential outcomes of the unit of competency.

Together, performance criteria specify the requirements for competent performance. Text in ***bold italics*** is explained in the Range Statement following.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Manage start-up activities	1.1 ***Project plans*** are refined in consultation with steering committee and team members, and precise details are included for schedules of activities, milestones and resources.
	1.2 ***Required systems*** are established and maintained throughout the project in accordance with the complexity of the project and in line with the project plan.
	1.3 Project team members' understanding of and commitment to fulfilling the project requirements and their roles and responsibilities for the duration of the project are confirmed.
	1.4 ***Project management tools*** are selected and applied effectively to achieve project outcomes.
2. Manage project implementation	2.1 ***Integration*** and ***management*** of complex project activities are handled in accordance with the project plan.
	2.2 Leadership and required ***development*** are provided to the project team, and morale, stress levels and triggers are managed throughout the life of the project in accordance with organisational ***policy and procedures***.
	2.3 ***Stakeholder*** input and expectations are managed throughout the project in accordance with the communication plan.
	2.4 Disagreements and disputes are resolved to the satisfaction of stakeholders or referred to a higher authority in accordance with organisational policy and procedures.
	2.5 Project ***change proposals*** are negotiated, agreed and documented in accordance with policy and procedures.
3. Manage project integration	3.1 All aspects of the project and related projects are integrated and links are established to ensure objectives are met in accordance with the project plan.

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ELEMENT	PERFORMANCE CRITERIA
	3.2 Consultation and reporting mechanisms are applied in accordance with the communication plan and staff and contractors are regularly consulted to discuss progress and ensure effective results.
	3.3 Project integration is monitored, and management plans and any related contracts are reviewed and amended as appropriate, with results reported in accordance with mechanisms identified in the communication plan.
	3.4 Ongoing progress is monitored against agreed milestones in accordance with the project plan to provide a measure of performance throughout the life of the project.
	3.5 Programmed review of objectives and achievement is planned and implemented in accordance with the project plan.
4. Coordinate project follow-up activities	4.1 Significant judgment is applied in the analysis of project deliverables against ***specifications***, performance standards and project objectives, and the results are reported to stakeholders.
	4.2 Support package arrangements are identified and offered to stakeholders who will be required to apply the project results.
	4.3 Options for stakeholders to take account of environmental and cultural factors in applying the project results are included in the support package.
	4.4 Operational and support authorities are consulted to investigate any testing/trialling/building and evaluation requirements resulting from the project, and funding implications estimated in project report.

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Skill requirements

Look for evidence that confirms skills in:

- leading and mentoring people to achieve project outcomes
- maintaining agreement of stakeholders and team members to timelines, roles and responsibilities
- negotiating with stakeholders and team members using communication styles to suit different audiences and purposes
- responding to diversity, including gender and disability
- using project management tools applicable to reasonably complex projects

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- applying ethical decision making and problem solving related to project management of reasonably complex projects
- writing recommendations and preparing project reports requiring precision of expression
- applying workplace safety procedures in line with project requirements
- accessing/preparing information electronically or in hard copy

Knowledge requirements

Look for evidence that confirms knowledge and understanding of:

- legislation, organisational policies and procedures that may impact on project implementation, for example:
  - public sector codes of ethics/conduct
  - occupational health and safety and environmental and sustainability requirements
- project governance requirements
- quality standards
- risk management
- procurement guidelines
- financial management and budgetary framework
- human resources
- equal employment opportunity, equity and diversity principles
- project management tools to suit a range of reasonably complex projects in terms of scope, degree of risk, political, cultural and social factors that apply, consequences of failure and degree of control of the project
- project management systems
- organisational and political context
- critical analysis in a project management context
- business and commercial issues related to the projects managed

Evidence Guide

The Evidence Guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the Unit descriptor, Performance Criteria, the Range Statement and the Assessment Guidelines for the Public Sector Training Package.

Units to be assessed together

- *Pre-requisite* units that must be achieved prior to this unit:*Nil*
- *Co-requisite* units that must be assessed with this unit:*Nil*
- *Co-assessed units* that may be assessed with this unit to increase the efficiency and realism of the assessment

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process include, but are not limited to:

- PSPETHC501B Promote the values and ethos of public service
- PSPGOV502B Develop client services
- PSPGOV503B Coordinate resource allocation and usage
- PSPGOV504B Undertake research and analysis
- PSPGOV505A Promote diversity
- PSPPM501B Design complex projects
- PSPPM503B Close complex projects
- PSPPROC501A Manage contract risk
- PSPPROC503A Manage contract performance

Overview of evidence requirements

In addition to integrated demonstration of the elements and their related performance criteria, look for evidence that confirms:

- the knowledge requirements of this unit
- the skill requirements of this unit
- application of the Employability Skills as they relate to this unit (see Employability Summaries in Qualifications Framework)
- management of complex projects in a range of (3 or more) contexts (or occasions, over time)

Resources required to carry out assessment

These resources include:

- legislation, guidelines, procedures and protocols relating to project management in the organisation and the public sector
- workplace project documentation
- scenarios and case studies
- examples of project management tools

Where and how to assess evidence

Valid assessment of this unit requires:

- a workplace environment or one that closely resembles normal work practice and replicates the range of conditions likely to be encountered when managing complete projects, including coping with difficulties, irregularities and breakdowns in routine
- management of complex projects in a range of (3 or more) contexts (or occasions, over time)

Assessment methods should reflect workplace demands, such as literacy, and the needs of particular groups, such as:

- people with disabilities
- people from culturally and linguistically diverse backgrounds

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- Aboriginal and Torres Strait Islander people
- women
- young people
- older people
- people in rural and remote locations

Assessment methods suitable for valid and reliable assessment of this competency may include, but are not limited to, a combination of 2 or more of:

- case studies
- demonstration
- portfolios
- questioning
- scenarios
- authenticated evidence from the workplace and/or training courses

For consistency of assessment

Evidence must be gathered over time in a range of contexts to ensure the person can achieve the unit outcome and apply the competency in different situations or environments

Range Statement

The Range Statement provides information about the context in which the unit of competency is carried out. The variables cater for differences between States and Territories and the Commonwealth, and between organisations and workplaces. They allow for different work requirements, work practices and knowledge. The Range Statement also provides a focus for assessment. It relates to the unit as a whole. Text in ***bold italics*** in the Performance Criteria is explained here.

Project plans will include some or all of:

- acquisition strategies
- budget and financial management strategy
- contract management
- cost estimates
- evaluation criteria
- expected outcomes/measurable benefits of the project
- facilities
- inclusions and exclusions from project
- information/communication strategy
- intellectual property strategies
- milestones
- objectives

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- outputs/project deliverables and their acceptance criteria
- people plan including human resource management and human resource development
- performance criteria/indicators
- project control mechanisms
- project implementation strategy
- project governance strategy
- purpose
- quality assurance
- quality control
- quality standards for project
- rationale
- required project resources
- resource management
- risk management
- roles and responsibilities
- schedule/timeline
- task/work breakdown structure (WBS)

Required systems for project management may include:

- planning and monitoring system
- financial management including:
- budget allocation/funding
- income generated
- expenditure
- recordkeeping for documented information such as:
- correspondence
- quality data including survey, needs, test results
- contracts
- time allocated and spent on each aspect of the project
- progress reports
- performance reports against milestones
- project outcomes
- samples, prototypes, models

Project management tools may include:

- risk analysis
- organisational project governance framework
- communications plan
- reporting framework
- project management software and other tools:
- Gantt and bar charts
- Program Evaluation and Review Technique (PERT) charts

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- Critical Path Method
- cost schedule control system
- logistics support analysis
- life cycle cost analysis
- spreadsheets
- recording systems - electronic and manual

Integration of project activities may include:

- scope
- time
- cost
- quality
- human resources
- communications
- risk
- procurement

Management may include:

- scope management
- communication and reporting
- schedule management
- financial management
- fraud control
- quality management
- resources management
- people management
- logistics management
- risk management
- contract management
- project implementation
- transition
- change management

Development may include:

- regular meetings
- feedback
- encouragement
- mentoring and coaching
- additional physical and human resources (within allocated budget) if and as required

Policy and procedures may include:

- government legislation (Federal, State and Local) affecting organisation's administration such as:
  - public sector management acts
  - financial management and accounting legislation and regulations

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- privacy legislation
- government and organisational guidelines and procedures relating to:
  - project governance
  - resourcing
  - security
  - strategic plans
  - recruitment
  - risk management
  - procurement guidelines
  - designation approvals
  - industrial agreements
  - environment and sustainability

Stakeholders may include:

- project sponsor/funding bodies
- clients or customers (internal and external)
- industry
- other agencies
- general public
- relevant interest groups
- unions
- functional areas
- the organisation's senior management
- Ministers
- project team
- steering committee
- end user
- supplier/service provider

Contract change proposals may include:

- administration
- cost
- engineering, technical, technology changes
- resources
- scope
- specifications
- time

Specifications may include:

- functional
- technical
- performance
- material

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Unit Sector(s)

Not applicable.

Competency field

Project Management.

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PSPPM503B Close complex projects

Modification History

Release	TP Version	Comments
3	PSP12V1	Unit descriptor edited.
2	PSP04V4.2.	Layout adjusted. No changes to content.
1	PSP04V4.1	Primary release.

Unit Descriptor

This unit covers closure of projects that may be reasonably complex in terms of scope, degree of risk, political, cultural and social factors that apply, consequences of failure and degree of control of the projects. It includes reviewing project activity and managing project closure. Contract management requirements are not included as this aspect is addressed by units of competency within the Competency field of *Procurement and Contract Management*.

In practice, closing complex projects overlaps with other generalist and specialist work activities such as acting ethically, coordinating resource allocation and usage, developing client services, undertaking research and analysis.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication

Application of the Unit

Not applicable.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements are the essential outcomes of the unit of competency.

Together, performance criteria specify the requirements for competent performance. Text in ***bold italics*** is explained in the Range Statement following.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Review project activity	1.1 Evaluation of project process, supplier performance and achievement against objectives is undertaken in consultation with ***stakeholders*** and results are reported in accordance with the ***project plan*** evaluation framework and organisational ***policy and procedures***. 1.2 The extent to which clients needs were met is evaluated and action to rectify problems is identified and documented. 1.3 Implications of project outputs/outcomes for policies and operating procedures are identified and recommendations are made for their amendment. 1.4 Information obtained from the evaluation of the project is provided in accordance with organisational requirements so it may be used to improve relevant policy and practice .
2. Manage project closure	2.1 Any funding associated with the project is acquitted against project budget items, and financial records are checked for accuracy and completed in accordance with organisational procedures. 2.2 Project wind-down is ***managed*** and ***documentation***, records and ***approvals*** are handled in accordance with project plan and organisational policy and procedures. 2.3 Project stakeholders are debriefed, and infrastructure and resources are redeployed in accordance with organisational policy and procedures. 2.4 Project hand-over to user/s is completed in accordance with organisational procedures, and lessons learnt are documented and reported to stakeholders to assist in continuous improvement. 2.5 Stakeholders are advised of procedures and authorities for initial support to apply project results where relevant, and strategies

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ELEMENT	PERFORMANCE CRITERIA
	are provided to manage long-term project momentum in accordance with organisational requirements.

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Skill requirements

Look for evidence that confirms skills in:

- analysing results and evaluating outcomes against objectives
- writing recommendations and preparing reports requiring precision of expression
- communicating with stakeholders and team members using a range of communication styles to suit different audiences and purposes
- responding to diversity, including gender and disability
- debriefing stakeholders and redeploying resources and infrastructure
- acquitting and reporting on resource expenditure including time and costs
- using project management tools applicable to reasonably complex projects
- applying workplace safety procedures in line with project requirements
- accessing/preparing information electronically or in hard copy

Knowledge requirements

Look for evidence that confirms knowledge and understanding of:

- legislation, organisational policies and procedures that may impact on project finalisation, for example:
  - public sector codes of ethics/conduct
  - occupational health and safety and environmental and sustainability requirements
  - project governance requirements
  - quality standards
  - risk management
  - procurement guidelines
  - financial management
  - human resource management and development
  - equal employment opportunity, equity and diversity principles
  - project specifications and objectives
- project management tools to suit a range of reasonably complex projects in

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terms of scope, degree of risk, political, cultural and social factors that apply, consequences of failure and degree of control of the project
- project management principles and systems
- critical analysis in a project management context
- business and commercial issues related to the projects managed
- organisational and political environment

Evidence Guide

The Evidence Guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the Unit descriptor, Performance Criteria, the Range Statement and the Assessment Guidelines for the Public Sector Training Package.

Units to be assessed together

- *Pre-requisite* units that must be achieved prior to this unit:*Nil*
- *Co-requisite* units that must be assessed with this unit:*Nil*
- *Co-assessed units* that may be assessed with this unit to increase the efficiency and realism of the assessment process include, but are not limited to:
  - PSPETHC501B Promote the values and ethos of public service
  - PSPGOV502B Develop client services
  - PSPGOV503B Coordinate resource allocation and usage
  - PSPGOV504B Undertake research and analysis
  - PSPGOV505A Promote diversity
  - PSPGOV507A Undertake negotiations
  - PSPGOV512A Use complex workplace communication strategies
  - PSPGOV517A Coordinate risk management
  - PSPPM501B Design complex projects
  - PSPPM502B Manage complex projects
  - PSPPROC504A Finalise contracts

Overview of evidence requirements

In addition to integrated demonstration of the elements and their related performance criteria, look for evidence that confirms:

- the knowledge requirements of this unit
- the skill requirements of this unit
- application of the Employability Skills as they relate to this unit (see Employability Summaries in Qualifications Framework)
- reviewing and closing complex projects in a range of (3 or

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more) contexts (or occasions, over time)

Resources required to carry out assessment

These resources include:

- legislation, guidelines, procedures and protocols relating to project close-out
- workplace project documentation
- scenarios and case studies
- examples of project management tools suited to reasonably complex projects

Where and how to assess evidence

Valid assessment of this unit requires:

- a workplace environment or one that closely resembles normal work practice and replicates the range of conditions likely to be encountered when reviewing and closing complex projects, including coping with difficulties, irregularities and breakdowns in routine
- reviewing and closing complex projects in a range of (3 or more) contexts (or occasions, over time)

Assessment methods should reflect workplace demands, such as literacy, and the needs of particular groups, such as:

- people with disabilities
- people from culturally and linguistically diverse backgrounds
- Aboriginal and Torres Strait Islander people
- women
- young people
- older people
- people in rural and remote locations

Assessment methods suitable for valid and reliable assessment of this competency may include, but are not limited to, a combination of 2 or more of:

- case studies
- demonstration
- observation
- portfolios
- projects
- questioning
- scenarios
- simulation or role plays
- authenticated evidence from the workplace and/or training courses

For consistency of

Evidence must be gathered over time in a range of contexts to

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assessment	ensure the person can achieve the unit outcome and apply the competency in different situations or environments

Range Statement

The Range Statement provides information about the context in which the unit of competency is carried out. The variables cater for differences between States and Territories and the Commonwealth, and between organisations and workplaces. They allow for different work requirements, work practices and knowledge. The Range Statement also provides a focus for assessment. It relates to the unit as a whole. Text in ***bold italics*** in the Performance Criteria is explained here.

Stakeholders may include:

- project sponsor/funding bodies
- clients or customers (internal and external)
- industry
- other agencies
- general public
- relevant interest groups
- unions
- functional areas
- the organisation's senior management
- Ministers
- project team
- steering committee members
- end user
- supplier/service provider

Project plan will include some or all of:

- acquisition strategies
- budget and financial management strategy
- contract management
- cost estimates
- evaluation criteria
- expected outcomes/measurable benefits of the project
- facilities
- inclusions and exclusions from project
- information/communication strategy
- intellectual property strategies
- milestones
- objectives
- outputs/project deliverables and their acceptance criteria
- people plan including human resource management and

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human resource development
- performance criteria/indicators
- project control mechanisms
- project implementation strategy
- project governance strategy
- purpose
- quality assurance
- quality control
- quality standards for project
- rationale
- required project resources
- resource management
- risk management
- roles and responsibilities
- schedule/timeline
- task/work breakdown structure (WBS)

Policy and procedures may include:

- government legislation (Federal, State and Local) affecting organisation's administration such as:
  - public sector management acts
  - financial management and accounting legislation and regulations
  - privacy legislation
- government and organisational guidelines and procedures relating to:
  - project governance
  - resourcing
  - security
  - strategic plans
  - recruitment
  - risk management
  - procurement guidelines
  - designation approvals
  - industrial agreements
  - environment and sustainability

Management of project wind-down may include:

- risks
- issues
- assets
- consultants
- project team
- support staff

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Documentation may include:	• project completion report • supplier performance reports • whole-of-life support plans • transfer documents • financial reports and acquittals • evaluation reports • transition plans
Approvals may be required from:	• project sponsor/funding body • business owner of the project • program manager • line manager • project governance office/personnel in the organisation • chief executive officer, manager or management representative • customer or client

Unit Sector(s)

Not applicable.

Competency field

Project Management.

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RIIOHS204A Work safely at heights

Modification History

Not applicable.

Unit Descriptor

This unit covers working safely at heights in resources and infrastructure industries. It includes: identifying the work requirements, work procedures and instructions for the task; accessing and installing equipment; performing work at heights; and cleaning up the work area.

Application of the Unit

This unit specifies the competency required to undertake safe working practices when working at heights or depths.

This unit is appropriate for those working in a operational roles, at worksites within:

- Civil construction
- Coal mining
- Drilling
- Extractive industries
- Metalliferous mining

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range

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	statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify work requirements	1.1. Access, interpret and apply ***compliance documentation*** relevant to working safely at heights 1.2. Identify the scope of the task 1.3. Adhere to ***OHS requirements*** associated with working safely at heights, and the workplace environment throughout the work 1.4. Inspect site to determine layout and physical condition, condition of structures, prevailing weather conditions, equipment requirements and potential hazards 1.5. Identify and document scope of the task and proposed work practices/activities 1.6. Identify, select and check safety equipment for serviceability 1.7. Identify, manage and report potential risks and hazards
2. Identify work procedures and instructions for the task	2.1. Select materials, ***tools and equipment***, including personal safety equipment, and check for serviceability 2.2. Inspect/install fall protection and perimeter protection equipment ensuring adequacy for work and conformance to regulatory requirements 2.3. Identify approved methods of moving tools and equipment to work area and minimise potential hazards associated with tools at heights 2.4. Install ***safety system*** in accordance with requirements 2.5. Select and install appropriate signs and barricades
3. Access and install equipment	3.1. Correctly fit, adjust and anchor fall protection and associated equipment

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	3.2. Make appropriate arrangements to install required equipment 3.3. Use recommended methods to access work area for people, tools and equipment 3.4. Place tools and materials to eliminate or minimise the risk of items being knocked down
4. Perform work at heights	4.1. Check access from ground to work area to ensure it is safe and in accordance with requirements 4.2. Keep fall equipment in place and adjusted appropriately to all for movement during work 4.3. Undertake manual handling of materials and equipment in accordance with requirements 4.4. Locate materials and equipment ensuring that they are safely secured and distributed 4.5. Check safety system periodically for compliance with requirements and procedures 4.6. Monitor risk control measures to ensure that they are effective and appropriate to the task and work environment 4.7. Reassess risk control measures, as required, in accordance with changed work practices and/or site conditions and undertake alterations
5. Clean up work area	5.1. Dismantle safety system in accordance with sequence and remove from worksite 5.2. Clear work area and dispose of or recycle materials 5.3. Clean, check, maintain and store tools and equipment

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.
Required skills
Specific skills are required to achieve the performance criteria in this unit, particularly

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for the application in the various circumstances in which this unit may be applied. This includes the ability to carry out the following as required to work safely at heights: • apply legislative, organisation and site requirements and procedures • access, interpret and apply technical and safety information • apply diagnostic/faultfinding techniques • apply environmental requirements • apply isolation procedures • work in varying weather conditions
Required knowledge
Specific knowledge is required to achieve the Performance Criteria of this unit, particularly its application in a variety of circumstances in which the unit may be used. This includes knowledge of the following, as required to work safely at heights: • the names and functions of equipment, components and materials • equipment manufacturer's instructions and specifications • safe shifting and handling of tools and materials • statutory and regulatory authority requirements • the nature of work undertaken at heights • heights safety systems • the processes of providing for safe working practices • safety equipment/systems and considerations to facilitate working safely at heights • safe work methods

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following: • knowledge of the requirements, procedures and instructions for working safely at heights • implementation of requirements, procedures and techniques for safe, effective and efficient working at heights

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	• working with others to undertake and complete work safely at heights that meets all of the required outcomes • consistent timely completion of work at heights that safely, effectively and efficiently meets the required outcomes
Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job. • Customisation of assessment and delivery environment to sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues. • Assessment of this competency requires typical resources normally used in the work environment. Selection and use of resources for particular worksites may differ due to site circumstances. • Where applicable, physical resources should include equipment modified for people with disabilities. • Access must be provided to appropriate learning and/or assessment support when required.
Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods: • written and/or oral assessment of the

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	candidate's required knowledge
	• observed, documented and/or first hand testimonial evidence of the candidate's:
	  • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes
	  • consistently achieving the required outcomes
	• first hand testimonial evidence of the candidate's:
	  • working with others to undertake and complete work safely at heights

Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Relevant compliance documentation may include:	• legislative, organisation and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • code of practice • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
OHS requirements may include those associated with:	• protective clothing and equipment • use of tools and equipment • workplace environment and safety • handling of materials • use of fire fighting equipment • use of First Aid equipment • hazard control

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	• hazardous materials and substances
Hazards may include:	• falling objects • removal of scaffold components • inappropriate carrying of materials on ladders • excessive bending or twisting in different work situations
Tools and equipment may include:	• fall protection • perimeter protection • signage and barricades • ladders • lifting/load shifting equipment including: • hand trolleys • rollers • forklifts • chain blocks • hoists • jacks • scaffolds • elevated work platforms • lifting equipment (such as cranes)
Safety systems may include:	• scaffolds • handrails • foot walks • kickboards • safety harness • harness fixing points

Unit Sector(s)

Occupational Health and Safety

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.

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RIIRIS201B Conduct local risk control

Modification History

Not applicable.

Unit Descriptor

This unit covers the conduct of local risk control in resources and infrastructure industries. It includes identifying hazards; assessing risk and identifying unacceptable risk; identifying, assessing and implementing risk treatments; and completing records and reports.

Application of the Unit

This unit is appropriate for those working in entry level operational roles, at worksites within:

- Civil construction
- Coal mining
- Drilling
- Extractive industries
- Metalliferous mining

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify hazards	1.1. Access, interpret and apply ***compliance documentation*** relevant to conducting local risk control 1.2. Inspect work area conditions to identify potential ***hazards*** in the workplace 1.3. Apply existing procedures to deal with recognised hazards 1.4. Recognise the type and scope of unresolved hazards and their likely impact
2. Assess ***risk*** and identify unacceptable risk	2.1. Assess and determine ***consequence*** if the event should occur 2.2. Consider and determine ***likelihood*** of the event 2.3. Identify criteria for the acceptability/unacceptability of the ***risk*** or source from the appropriate party 2.4. Assess risk against criteria to identify if it warrants '***unacceptable risk'*** status and either action or refer to the appropriate party
3. Identify, assess and implement risk treatments	3.1. Identify and consider all possible ***risk treatment options*** 3.2. Identify options by preliminary analysis and consideration of possible options 3.3. Analyse options, including the identification of resource requirements 3.4. Select most appropriate action for dealing with the situation 3.5. Plan and prepare the course of action in detail and acquire/obtain required resources 3.6. Implement the risk treatment 3.7. Review risk management processes
4. Complete records and reports	4.1. Communicate information on the course of action and implementation 4.2. Complete ***records and reports*** for hazards and actions from personal risk assessment as specified by legislation and site

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	requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Specific skills are required to achieve the performance criteria in this unit, particularly for the application in the various circumstances in which this unit may be applied. This includes the ability to carry out the following as required to conduct local risk control:

- apply legislative, organisation and site requirements and procedures
- speak clearly and directly, listen carefully to instructions and information, respond to and clarify directions
- collect, analyse and organise information
- access, interpret and apply site information
- work with other team members
- apply teamwork to a range of situations
- apply problems solving skills
- apply decision making skills
- show initiative in adapting to changing work conditions or contexts
- apply time management
- take responsibility for self organisation of work priorities
- apply mathematical skills to perform a basic risk ranking of hazards
- interpret and apply material safety data sheets (MSDS)

Required knowledge

Specific knowledge is required to achieve the performance criteria of this unit, particularly its application in a variety of circumstances in which the unit may be used. This includes knowledge of the following as required to conduct local risk control:

- risk management processes and methods, including: identifying hazards, assessing risks, determining acceptability of risks, identifying controls
- AS/NZS 4360-2004 Risk Management
- specific worksite risk management procedures
- specific worksite safety systems information
- specific worksite communication, reporting and recording procedures

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following: • knowledge of the requirements, procedures and instructions to conduct local risk control • implementation of requirements, procedures and techniques for the safe, effective and efficient conduct of local risk control • working with others to undertake and conduct of local risk control that meets all of the required outcomes • consistent timely completion of conducting local risk control that safely, effectively and efficiently meets the required outcomes
Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job. • Customisation of assessment and delivery environment to sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues.

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	• Assessment of this competency requires typical resources normally used in the work environment. Selection and use of resources for particular worksites may differ due to site circumstances. • Where applicable, physical resources should include equipment modified for people with disabilities. • Access must be provided to appropriate learning and/or assessment support when required.

Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods:
	• written and/or oral assessment of the candidate's required knowledge
	• observed, documented and/or first hand testimonial evidence of the candidate's:
	  • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes
	  • consistently achieving the required outcomes
	• first hand testimonial evidence of the candidate's:
	  • working with others to undertake and conduct of local risk control

Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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Relevant compliance documentation may include:	• legislative, organisation and site requirements and procedures • Australian standards • code of practice • Employment and Workplace Relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Hazard is defined as:	• a source of potential harm or a situation with a potential to cause loss
Hazards may include:	• equipment • stored energy • methods • plans • people • the work environment
Risk is defined as:	• The chance of something happening that will have an impact upon objectives. It is measured in terms of consequences and likelihood
Risk treatment is defined as:	• selection and implementation of appropriate options for dealing with risk
Consequence is defined as:	• the outcome of an event or situation expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain
Frequency is defined as:	• a measure of likelihood expressed as the number of occurrences of an event in a given time
Likelihood is used as:	• a qualitative description of probability and frequency
Probability is defined as:	• the measure of the chance of occurrence expressed as a number between 0 and 1
Criteria for the acceptability/ **unacceptability of the risk** must be determined by:	• the organisation's internal policy, goals and/ or objectives in reference to relevant legislation
Risk treatmentoptions may include:	• eliminating the hazard • substitution • engineering controls • administrative controls (procedures, etc) • personal protective equipment.
Records and reports may include:	• hazard reporting forms • supervisor/deputy/OCE reports

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	• incident reports • near miss reports • shift reports • JSAs • Take 5 • Step Back

Unit Sector(s)

Risk Management

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.

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SIRXCCS201 Apply point-of-sale handling procedures

Modification History

The version details of this endorsed unit are in the table below. The latest information is at the top.

Release Date	Comments
First Release:	This is a revised unit, based on and equivalent to SIRXCCS001A Apply point-of-sale handling procedures.

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to operate point-of-sale equipment, apply store policy and procedures to a range of transactions, interact with customers, and package or wrap an item for transportation.

It covers demonstration of the ability to operate a range of point-of-sale equipment in order to complete sales, returns and exchange transactions, and process a number of methods of payment, according to store policies.

Application of the Unit

This unit applies to frontline service personnel.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Nil

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements and Performance Criteria

Element	Performance Criteria
Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
1. Operate point-of-sale equipment.	1.1. Open and close point-of-sale terminal according to ***store policy and procedures***. 1.2. Clear point-of-sale terminal and transfer tender according to store procedure. 1.3. Handle cash according to store security procedures. 1.4. Maintain supplies of change in point-of-sale terminal according to store policy. 1.5. Attend active point-of-sale terminals according to store policy. 1.6. Complete records for transaction errors according to store policy. 1.7. Maintain adequate supplies of dockets, vouchers and ***point-of-sale documents***. 1.8. Inform ***customers*** of delays in the point-of-sale operation where required.
2. Ensure accuracy of transactions.	2.1. Identify and perform ***numerical calculations*** to ensure accurate pricing and collection of money. 2.2. Collect numerical information from various sources and calculate accurately with or without the use of a calculator.
3. Perform point-of-sale transactions.	3.1. Complete ***point-of-sale transactions*** according to store policy. 3.2. Identify and apply store procedures in respect of cash and non cash transactions. 3.3. Identify and apply store procedures in regard to exchanges and returns. 3.4. Move goods through point-of-sale area efficiently and with attention to fragility and packaging. 3.5. Enter information into ***point-of-sale equipment***. 3.6. State price or total and amount of cash received verbally to customer. 3.7. Tender correct change.

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4. Complete sales.	4.1. Complete customer order forms, invoices and receipts and process any loyalty card transactions. 4.2. Identify and process customer delivery requirements according to set timeframes. 4.3. Process sales transactions or direct customers to point-of-sale terminals according to store policy without undue delay. 4.4. Acknowledge and thank customer in line with store policy and procedures.
5. Wrap and pack goods.	5.1. Maintain and request adequate supplies of ***wrapping and packaging materials***. 5.2. Select appropriate wrapping or packaging material. 5.3. Wrap merchandise neatly and effectively where required. 5.4. Pack items safely to avoid damage in transit, and attach labels where required. 5.5. Arrange transfer of merchandise for parcel pick up or other ***delivery methods*** if required.

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication and interpersonal skills to:
  - ask questions to identify and confirm requirements
  - inform customers of delays
  - listen actively
  - request adequate supplies of wrapping material or bags through clear and direct communication
  - share information
  - state price or total and amount of cash received
  - use and interpret non-verbal communication
  - use language and concepts appropriate to cultural differences
- self-management skills to:
  - deal with different types of transactions
  - follow set routines and procedures
- literacy and numeracy skills to:
  - document sales and delivery information
  - render change
  - undertake work functions, including addition, division, multiplication, percentages and subtraction

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Required knowledge

- cash and non-cash handling procedures, including:
  - balancing point-of-sale equipment
  - calculating non-cash documents
  - change required, denominations of change and tendering change
  - clearance of terminal and transference of tender
  - counting cash
  - maintenance of cash float
  - opening and closing point-of-sale terminal
  - recording takings
  - security of cash and non-cash transactions
- functions and procedures for operating point-of-sale equipment, including:
  - calculators
  - electronic scales
  - numerical display board
  - registers
- merchandise handling techniques, including wrapping and packaging techniques
- range of services provided by the store
- relevant legislation and statutory requirements, including:
  - industry codes of practice
  - work health and safety (WHS)
  - Australian consumer law
  - scanners
- store policy and procedures in relation to:
  - allocated duties and responsibilities
  - bag checking
  - customer service
  - exchanges and returns
  - handling, packing and wrapping goods or merchandise
  - point-of-sale transactions
- stock availability
- key features of a calculator

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • operates point-of-sale equipment according to manufacturer instructions and store policy and procedures • applies store policy and procedures in regard to cash handling and point-of-sale transactions • interprets, calculates and records numerical information accurately • processes sales transaction information responsibly and accurately according to store policy and procedures • applies store policy and procedures in regard to the handling, packing, wrapping and delivery of goods or merchandise.

Context of and specific resources for assessment	Assessment must ensure access to:
	• a real or simulated retail work environment
	• relevant documentation, such as:
	  • stock, inventory and price lists
	  • financial transaction dockets and slips
	  • lay-by, credit and product return slips
	  • store policy and procedures manuals
	• a range of point-of-sale equipment.

Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • observation of performance in the work • role play • customer feedback • answers to questions about specific skills and knowledge • review of portfolios of evidence and third-party workplace reports of on-the-job performance.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, work and job role is recommended, for example: • SIRXCCS202 Interact with customers • SIRXFIN201 Balance and secure point-of-sale terminal • SIRXINV001A Perform stock control procedures • SIRXRSK201 Minimise loss.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the

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performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the individual, accessibility of the item, and local industry and regional contexts) may also be included.

Store policy and procedures in regard to:	• cash handling • financial transactions • handling techniques of stock • operation of point-of-sale equipment • sales transactions • security.
Point-of-sale documents may include:	• credit slips • lay-by slips • message pads • order forms • product return slips • promotional materials.
Customers may include:	• customers with routine or special requests • internal and external contacts • new or repeat contacts • people from a range of social, cultural and ethnic backgrounds • people with varying physical and mental abilities.
Numerical calculations may include:	• addition and subtraction • calculations of cash amounts and change • calculations of discount amounts • estimation of quantities • measurement • multiplication and division • percentages.
Point-of-sale transactions may include:	• cheques • credit cards and store cards • EFTPOS • exchanges • gift vouchers • lay-by • returns • smart cards • travellers cheques.
Point-of-sale equipment may include:	• cash drawer • cash register • EFTPOS terminal • electronic scales • numerical display board

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	• scanner • security tagging.
Wrapping and packaging materials may include:	• adhesive tape • bags • boxes • bubble wrap • gift wrapping • paper • ribbon • string.
Delivery methods may include:	• courier • domestic or international delivery • freight • parcel pick-up • post or express post.

Unit Sector(s)

Cross-Sector

Competency Field

Client and Customer Service

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SIRXINV004A Buy merchandise

Modification History

Not applicable.

Unit Descriptor

Unit descriptor This unit describes the performance outcomes, skills and knowledge required to buy merchandise in a retail environment. It involves analysing the market, planning the product range, establishing supplier relationships, negotiating supply of goods, introducing the product range, maximising profit and rationalising stock.

Application of the Unit

Application of the unit This unit requires the consistent application of store policy and legislative requirements in regard to market analysis, planning merchandise and service ranges, procurement and rationalisation of stock, maintenance of supplier relations, quality control and staff merchandise training. The team member is required to recognise known and unknown loss and how it affects buying and ordering patterns, and to interpret and apply market trends to the store situation to create opportunities to improve sales and service while maximising profits.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units Nil

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Prerequisite units Nil

Employability Skills Information

Employability skills The required outcomes described in this unit contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit is packaged will assist in identifying employability skills requirements.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Analyse market.	1.1 Identify and analyse ***store merchandise and marketing policy and procedures***.
	1.2 Monitor ***customer requirements*** formally and informally in order to evaluate market trends and customer needs.
	1.3 Research new products and services.
	1.4 Identify, evaluate, implement and review opportunities to improve sales.
	1.5 Monitor ***merchandise range*** to identify the demand for individual items and seasonal variations.
	1.6 Monitor market competition.

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ELEMENT	PERFORMANCE CRITERIA
2 Analyse factors affecting stock levels and range requirements.	2.1 Apply mathematical calculations to measure analyse and report on existing and potential stock loss and dissipation and its ***impact on business operations***.
	2.2 Analyse store or department sales figures to determine contribution rates of product lines.
	2.3 Determine store or department space requirements and brand product mix according to store policy.
	2.4 Determine future directions for merchandise ranges according to store policy.
3 Plan merchandise ranges.	3.1 Develop and implement buying plan according to outcomes of analysis and store policy.
	3.2 Determine future directions for merchandise ranges according to store policy.
	3.3 Liaise with ***relevant personnel*** to coordinate promotional and marketing activities.
	3.4 Analyse store or department sales figures to determine contribution rates of product lines.
	3.5 Determine investment levels with reference to previous years' sales figures, predicted demand and projected gross profit.
	3.6 Identify and act upon contribution improvement opportunities.
	3.7 Determine store or department space requirements and brand product mix according to store policy.
	3.8 Determine stock levels according to peak seasons, special events and supplier lead time.
	3.9 Analyse, evaluate and amend merchandise range and sources of supply according to management, staff and customer ***feedback***.
4 Establish supplier relations.	4.1 Develop cooperative relationships with supplier representatives according to store policy.
	4.2 Continuously review existing suppliers in regard to quality, profitability, service and delivery status.
	4.3 Identify new suppliers and delete existing suppliers according to ***performance indicators***.

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ELEMENT	PERFORMANCE CRITERIA
5 Negotiate supply of goods.	5.1 ***Negotiate*** and implement arrangements with suppliers according to store policy and procedures, and communicate to relevant personnel.
	5.2 Authorise special ***pricing arrangements*** and customer payment agreements and communicate to relevant staff and management personnel according to store policy.
	5.3 Monitor records of suppliers and stock for accuracy and legibility and take appropriate action where necessary.
	5.4 Identify ***market factors*** affecting supply and communicate to relevant personnel.
	5.5 Convey complete and accurate records of negotiations and agreements to relevant personnel within designated timelines.
	5.6 Take immediate corrective action where potential or actual problems with supply are indicated.
	5.7 Identify and develop new suppliers to maintain and improve sales and service delivery.
	5.8 Analyse, evaluate and amend stock range and source of supply according to management, staff and customer feedback.
6 Monitor quality control.	6.1 Establish merchandise quality standards with suppliers according to ***legal requirements***, customer requirements and store policy.
	6.2 Monitor and ensure quality of merchandise during supply, manufacture and delivery processes.
	6.3 Record and analyse stock return figures against target figure.
7 Introduce product ranges.	7.1 Inform relevant personnel of new product ranges and advise on preferred location of merchandise.
	7.2 Implement ***staff training*** in product knowledge to introduce product range.
	7.3 Demonstrate or display new ranges to ***staff*** according to store merchandising plan.

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ELEMENT	PERFORMANCE CRITERIA
8 Maximise profit.	8.1 Calculate or estimate individual product range contributions against budget and targets.
	8.2 Develop and implement product range assessment checks against budget and targets.
	8.3 Calculate or estimate overall selling space contributions according to store merchandising plan.
	8.4 Maximise profit margins in negotiations with suppliers.
	8.5 Determine store pricing policies according to stated net profit margin in store merchandising plan and consumer law.
	8.6 Negotiate specifications for ***terms of trade***.
9 Rationalise stock.	9.1 Review and update stock range at regular intervals.
	9.2 Identify stock lines to be ***deleted*** and take action to minimise adverse effect on profit.
	9.3 ***Consolidate stock*** as required to maximise sales potential.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

The following skills must be assessed as part of this unit:

- evaluating and analysing:
  - market trends and projections
  - sales figures and investment levels
  - space requirements
- negotiation skills
  - interpersonal communication skills to:
  - liaise with relevant personnel
  - establish supplier relationships, negotiate supply of goods
  - provide information and training on product range
  - provide feedback and coaching through clear and direct communication

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REQUIRED SKILLS AND KNOWLEDGE

- ask questions to identify and confirm requirements
- give instructions
- use language and concepts appropriate to cultural differences
- use and interpret non-verbal communication
- group presentation skills
- report writing
- using and applying technology, including electronic data interchange
- literacy and numeracy skills in relation to:
  - developing pricing policies
  - calculating and estimating product range contributions
  - calculating the cost of stock loss and dissipation
  - analysing stock figures.

The following knowledge must be assessed as part of this unit:

- store policy and procedures in regard to:
  - marketing
  - buying
  - profit margins
  - quality control
  - stock inventory levels: current and future
  - stock location and allocated areas
- staff product knowledge training
- industry and store information, including:
  - market needs
  - range of merchandise available
  - market competition
  - existing and possible new suppliers
  - channels of distribution
- relevant legislation and statutory requirements
- relevant industry codes of practice
  - pricing procedures, including GST requirements.

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the following is essential:

- consistently applies store policy and procedures, industry codes of practice, statutory requirements and regulations in regard to buying, merchandising and marketing practices
- applies market analysis, planning, procurement and rationalisation of stock and merchandise and service ranges, maintenance of supplier relations and quality control
- interprets market trends and applies these to the store situation to create opportunities to improve sales and services, while maximising profits
- analyses market and plans the introduction of a product and service range
- identifies suppliers, negotiates supply of goods, rationalises stock and monitors quality control
- trains and communicates information to and from staff or team members in regard to stock and merchandise and service range.

Context of and specific resources for assessment

Assessment must ensure access to:

- a retail work environment
- relevant information and documentation, including:
  - store policy and procedures
  - legislation and statutory requirements
  - industry codes of practice
  - merchandise and supplier data.

Methods of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- observation of performance in the workplace
- third-party reports from a supervisor
- customer feedback
- written or verbal questioning to assess knowledge and

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EVIDENCE GUIDE

	understanding • review of portfolios of evidence and third-party workplace reports of on-the-job performance. Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.
Assessing employability skills	Employability skills are integral to effective performance in the workplace and are broadly consistent across industry sectors. How these skills are applied varies between occupations and qualifications due to the different work functions and contexts. Employability skills embedded in this unit should be assessed holistically in the context of the job role and with other relevant units that make up the skill set or qualification.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the performance criteria is detailed below.

Store merchandise and marketing policies may include:	• store culture • current market position • target market.
Customer requirements may be monitored by:	• questionnaires • surveys • observation.
Merchandise range may include:	• existing stock • new stock.

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RANGE STATEMENT

Impact on business operations may include:	• buying • ordering patterns • planning • budgeting.
Relevant personnel may include:	• frontline staff • relevant managers • supervisor • team leader • specialist staff.
Feedback may be sought and given:	• verbally • in writing • in groups • individually.
Performance indicators may include:	• price • quality • performance • supply reliability • merchandise range.
Negotiation process may include:	• face-to-face • correspondence • meetings • telephone or electronic media.
Pricing arrangements may include:	• cash on delivery (COD) • cheque • credit card • invoice • GST.
Market factors may include:	• fashion trends • product availability • sales performance.

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RANGE STATEMENT

Legal requirements may include:	• sale of second-hand goods • Trade Practices and Fair Trading Acts • licence, patent or copyright arrangements • pricing procedures, including GST requirements.
Staff training may include:	• on-the-job • off-the-job • one-on-one coaching • any combination of the above.
Staff may include:	• full-time, part-time, casual or contract staff • people from a range of social, cultural and ethnic backgrounds • people with varying degrees of language and literacy levels.
Terms of trade may include:	• special buys • payment terms • promotional deals with supplier.
Stock lines may be ***deleted*** due to:	• changes in store policy and culture • sales performance • customer requirements • fashion trends • product availability • problems with supply.
Methods to ***consolidate stock*** may include:	• movement of stock between departments or stores.

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Unit Sector(s)

Sector Cross-Sector

Competency field

Competency field Inventory

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SIRXMER303 Coordinate merchandise presentation

Modification History

The version details of this endorsed unit are in the table below. The latest information is at the top.

Release	Comments
First Release	This is a revised unit, based on and equivalent to SIRXMER002A Coordinate merchandise presentation.

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to apply knowledge of store merchandising and pricing policy and standards to support and coordinate relevant frontline staff members and ensure that they arrange, present and label or price merchandise according to store requirements.

It also involves informing staff of store merchandise presentation requirements for sales, promotions and special events, and providing feedback to management in regard to improvement of store marketing and promotional activities.

Application of the Unit

This unit applies to frontline visual merchandisers who supervise sales and other staff implementing and maintaining displays according to store merchandising standards.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Nil

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements and Performance Criteria

Element	Performance Criteria
Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
1. Instruct and coordinate staff.	1.1. Communicate and demonstrate store ***display standards and requirements*** to ***staff***. 1.2. Identify occurrence and timing of promotions and special events and inform staff. 1.3. Identify items to be advertised or promoted, according to store merchandising policy and inform staff. 1.4. Identify appropriate timing for dismantling and disposing of displays and inform staff.
2. Supervise construction and maintenance of presentations.	2.1. Plan and coordinate promotions and special events as directed by management. 2.2. Plan and supervise construction and maintenance of ***displays*** in order to achieve balance and visual impact. 2.3. Ensure product or service ***display information*** accurately depicts product or service being promoted. 2.4. Ensure displays are completed according to required time schedule, with minimum disruption to ***customer*** service and traffic flow. 2.5. Ensure displays are constructed and maintained in a safe and secure manner. 2.6. Regularly monitor replenishment of merchandise and rotation of stock on store displays and take action as required.
3. Implement merchandise pricing.	3.1. Implement store policy and procedures in regard to pricing and ticketing. 3.2. Identify current prices for products and services and amend according to store policy. 3.3. Inform team members of price changes and current pricing policies.
4. Review merchandise presentations.	4.1. Evaluate promotions or special events against sales turnover and store presentation standards. 4.2. Evaluate merchandise presentation against sales turnover and store presentation standards. 4.3. Provide management with feedback in regard to improvement of

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store marketing and promotional activities.

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication and interpersonal skills to:
  - give instructions
  - provide feedback to management through clear and direct communication
  - provide information to staff
  - share information
  - use and interpret non-verbal communication
  - use language and concepts appropriate to cultural differences
- literacy and numeracy skills to:
  - prepare machine or manual labels and tickets
  - present and price merchandise
  - read and interpret store policies and procedures
- observation skills to assess display and presentation compliance with visual merchandising standards
- technology skills to operate and maintain electronic labelling and ticketing equipment
- team leadership skills to:
  - instruct and support staff
  - supervise staff activities

Required knowledge

- availability and use of materials
- correct storage procedures for labelling and ticketing equipment and materials
- load-bearing capacity of fixtures and display areas
- location of display areas
- manufacturer specifications for the use of electronic labelling and ticketing equipment
- occurrence and timing of store promotions, including advertising, catalogues and special offers
- pricing procedures, including GST requirements
- principles and techniques of interpersonal communication skills
- principles of display and design
- procedure for accessing information and implementing price changes
- relevant industry codes of practice relating to coordinating merchandise presentation
- relevant legislation and statutory requirements relating to coordinating merchandise presentation, including Australian Consumer Law

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- relevant work health and safety (WHS) legislation and codes of practice
- store policies and procedures in regard to:
  - efficient use of resources
  - merchandise range
  - merchandising, pricing and ticketing
  - minimum stock levels required
  - stock rotation and replenishment
  - storage of stock
- store promotional themes

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the following is essential:

- implements and instructs staff regarding store display, merchandising, ticketing and pricing policies and procedures
- coordinates and monitors display, promotion and presentation of merchandise according to store policies and procedures and legislative requirements
- identifies products to be advertised or promoted according to store merchandising policies
- coordinates construction and maintenance of displays within time schedule set in regard to advertising, catalogues, special offers and in-store promotions in a safe and secure manner
- informs staff of pricing policies, promotions, special events, display standards and requirements, and timing for dismantling and disposing of displays
- evaluates and reports effectiveness of store merchandising and promotional activities to management and staff as required by store policies and procedures.

Context of and specific resources for assessment

Assessment must ensure access to:

- a real or simulated retail work environment
- pricing and ticketing equipment
- merchandise for display
- display materials and props
- relevant documentation, such as:
  - store policy and procedures manuals on merchandising
  - WHS requirements

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- manufacturer instructions and operation manuals on electronic ticketing equipment
- legislation and statutory requirements
- industry codes of practice
- a work team.

Method of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- observation of performance in the workplace
- third-party reports from a supervisor
- customer feedback
- answers to questions about specific skills and knowledge.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the individual, accessibility of the item, and local industry and regional contexts) may also be included.

Display standards and requirements may include:

- maintaining existing displays
- safety
- setting up new displays
- ticketing and display signage.

Staff may be:

- from a range of social, cultural and ethnic backgrounds
- from within or outside own work team
- full-time, part-time, casual or contract.

Displays may be located in a variety of areas, including:

- fixtures on floor
- interior or exterior
- permanent or temporary
- publicly accessible areas
- shelves
- walls
- windows.

Display information may include:

- discount information
- price

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- product brand
- special guarantees
- product characteristics, such as:
  - size
  - weight capacity
  - materials.

Customers may include:

- internal and external contacts
- new or repeat contacts
- people from a range of social, cultural and ethnic backgrounds
- people with varying physical and mental abilities.

Unit Sector(s)

Cross-Sector

Competency Field

Merchandising

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SIRXMER004A Manage merchandise and store presentation

Modification History

Not applicable.

Unit Descriptor

Unit descriptor This unit describes the performance outcomes, skills and knowledge required to manage merchandise and store presentation.

Application of the Unit

Application of the unit This unit requires the team member to apply knowledge of store merchandising to plan and manage store advertising and promotions, manage store pricing policies and housekeeping. It includes interpretation of and compliance with store layout and visual merchandising policies, developing and implementing procedures to manage merchandise pricing, and managing all aspects of store housekeeping, including contingency procedures. This role applies to frontline retail managers.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units Nil

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Employability Skills Information

Employability skills The required outcomes described in this unit contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit is packaged will assist in identifying employability skills requirements.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Manage store merchandising.	1.1 Ensure layout and presentation support market position and promote customer flow according to store ***visual merchandising policies and plans***.
	1.2 Develop and implement layout assessment checks.
	1.3 Define standards for visual presentations and displays and clearly communicate to all staff
	1.4 Consult floor staff to assess customer response to space allocations.
2 Plan and manage store advertising and promotions.	2.1 Manage and implement store policies and procedures, in regard to store ***promotional activities***.
	2.2 Organise activities in line with anticipated or researched customer requirements.
	2.3 Manage ***promotions*** in order to achieve maximum customer impact.

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ELEMENT	PERFORMANCE CRITERIA
	2.4 Negotiate arrangements with suppliers in regard to special promotional activities.
	2.5 Coordinate store activities to complement shopping centre or retail complex promotions.
	2.6 Develop and implement assessment checks to measure effectiveness of promotions, including layout, visual impact and customer response.
	2.7 Document and report on promotional activities.
3 Manage store pricing policies.	3.1 Maintain store pricing according to ***organisation pricing policies and procedures*** in regard to pricing.
	3.2 Maintain accurate information on pricing trends and changes and communicate to relevant staff.
	3.3 Develop and implement procedures for pricing according to store policies and ***legislative requirements***.
4 Manage housekeeping.	4.1 Develop and implement store policies and procedures in regard to ***store housekeeping and maintenance***.
	4.2 Develop and manage rosters or schedules, ensuring store housekeeping standards are monitored and maintained.
	4.3 Initiate ***contingency plan*** in the event of merchandise or store presentation problems.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

The following skills must be assessed as part of this unit:

- providing feedback on performance
- interpersonal communication skills to:
  - communicate store standards and expectations to staff
  - consult floor staff
  - negotiate arrangements with suppliers, through clear and direct communication
  - ask questions to identify and confirm requirements

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REQUIRED SKILLS AND KNOWLEDGE

- use language and concepts appropriate to cultural differences
- use and interpret non-verbal communication
- roster development
- report writing
- literacy skills in regard to:
  - researching, analysing and interpreting a broad range of written material
  - preparing rosters
  - preparing reports
  - documenting results

The following knowledge must be assessed as part of this unit:

- store policies and procedures, in regard to:
  - layout and presentation
  - advertising and promotions
  - pricing or marking down of goods, including risk assessment
  - housekeeping for premises, fittings, fixtures and equipment
  - store merchandise and service range
  - store merchandising plan
  - range and availability of new products and services
  - customer demand and market trends
  - product quality standards
- OHS legislation and codes of practice
- relevant legislation and statutory requirements
- relevant industry codes of practice
- pricing procedures, including GST requirements
- principles and techniques in:
  - visual merchandising
  - project management

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

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EVIDENCE GUIDE

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the following is essential:

- collaboratively plans layout and presentation of merchandise according to store policies and procedures
- assesses effectiveness of layout and presentation according to sales targets or predetermined objectives
- collaboratively plans, coordinates and implements advertising and promotions activities according to store policies and procedures
- assesses and reports on effectiveness of advertising and promotions to staff and management according to store policies and procedures
- collaboratively plans, coordinates and implements pricing activities according to store policies and procedures
- collaboratively plans, coordinates and implements housekeeping activities according to store policies and procedures and OHS legislation, regulations and codes of practice.

Context of and specific resources for assessment

Assessment must ensure access to:

- a retail work environment
- relevant documentation, such as:
  - store policy and procedures manuals
  - store merchandising plan
  - legislation and statutory requirements
  - OHS legislation, regulations and codes of practice
- a work team.

Methods of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- observation of performance in the workplace
- third-party reports from a supervisor
- customer feedback
- answers to questions about specific skills and knowledge.

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

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EVIDENCE GUIDE

Assessing employability skills	Employability skills are integral to effective performance in the workplace and are broadly consistent across industry sectors. How these skills are applied varies between occupations and qualifications due to the different work functions and contexts. Employability skills embedded in this unit should be assessed holistically in the context of the job role and with other relevant units that make up the skill set or qualification.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the performance criteria is detailed below.

Visual merchandising policies and plans may include:	• target market • market research • store image • store layout and space availability • seasonal lines • pricing policy.
Promotional activities may involve:	• external and in-store activities • corporate or locally based activities • dealing with advertising agencies and consultants.
Promotions may include:	• advertising • catalogues • newspapers • posters • radio or TV • suppliers

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RANGE STATEMENT

	• internet • website.
Organisation pricing policies and procedures may include:	• marking down of slow moving stock • soiled or damaged goods • goods close to use-by date • end of season stock • pricing policies, including GST requirements.
Legislative requirements may include:	• Trade Practices and Fair Trading Acts • consumer law.
Store housekeeping and maintenance may include:	• store premises • fittings • fixtures • equipment.
Contingency plan may include:	• major spillages • flood, storm or cyclone • breakages • blackout • break-in.

Unit Sector(s)

Sector Cross-Sector

Competency field

Competency field Merchandising

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SIRXRSK001A Minimise theft

Modification History

Not applicable.

Unit Descriptor

Unit descriptor This unit describes the performance outcomes, skills and knowledge required to minimise theft in a retail environment. It involves applying routine store security, taking appropriate action to minimise theft and maintaining security of cash, registers or terminals and keys.

Application of the Unit

Application of the unit This unit applies to frontline service personnel. It requires the team member to apply store policy and procedures and industry codes of practice in regard to store security and theft prevention, reporting theft or suspicious behaviour to relevant personnel and monitoring stock, work areas, customers and staff to minimise opportunities for theft.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units Nil

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Employability Skills Information

Employability skills The required outcomes described in this unit contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit is packaged will assist in identifying employability skills requirements.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Apply routine store security.	1.1 Apply store ***security systems and procedures*** according to store policy. 1.2 Handle and secure cash according to ***store policy and procedures***. 1.3 Observe and deal with suspect behaviour by ***customers*** according to store policy and ***legislative requirements***. 1.4 Deal with internal and external theft according to store policy and legislative requirements. 1.5 Store products and equipment in a secure manner.
2 Minimise theft.	2.1 Take appropriate action to minimise theft by applying store procedures and legislative requirements. 2.2 Match merchandise to correct price tags. 2.3 Maintain surveillance of merchandise according to store policy and ***legislative requirements***.

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ELEMENT	PERFORMANCE CRITERIA
	2.4 Check customers' bags as required at point of sale according to store policy and legislative requirements.
	2.5 Maintain security of cash, cash register and keys according to store policy.
	2.6 Maintain security of stock, cash and equipment in regard to customers, ***staff*** and outside contractors according to store policy and legislative requirements.
	2.7 Deal with suspected or potential thieves according to store policy and procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

The following skills must be assessed as part of this unit:

- literacy and numeracy skills in:
  - recording of stolen items
  - reporting of theft.

The following knowledge must be assessed as part of this unit:

- store policy and procedures in regard to:
  - security
  - checking customers' bags and purchases
  - reporting problems and faults
- relevant legislation and statutory requirements, particularly in regard to checking customers' bags and purchases
- Trade Practices and Fair Trading Acts
- store merchandising system
- security procedures relating to cash and non-cash transactions
- location and operation of store security equipment
- reporting procedures for internal and external theft or suspicious circumstances.

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Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the following is essential:

- consistently applies store policy and procedures and legislative requirements, including industry codes of practice in regard to store security and theft prevention in a range of contexts and situations
- consistently applies store policy and procedures in regard to following security procedures and for reporting theft or suspicious behaviour to relevant personnel
- monitors stock, work area, customers and staff to minimise opportunities for theft.

Context of and specific resources for assessment

Assessment must ensure access to:

- a real or simulated work environment
- relevant documentation, such as:
  - store policy and procedures manuals
  - legislation and statutory regulations
  - industry codes of practice
  - Trade Practices and Fair Trading Acts
- relevant security equipment
- point-of-sale equipment.

Methods of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- observation of performance in the workplace
- a simulated work environment
- third-party reports from a supervisor
- customer feedback
- answers to questions about specific skills and knowledge
- review of portfolios of evidence and third-party

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EVIDENCE GUIDE

workplace reports of on-the-job performance.

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:

- SIRXCCS001A Apply point-of-sale handling procedures
- SIRXCCS002A Interact with customers
- SIRXINV001A Perform stock control procedures
- SIRXFIN001A Balance point-of-sale terminal.

Assessing employability skills

Employability skills are integral to effective performance in the workplace and are broadly consistent across industry sectors. How these skills are applied varies between occupations and qualifications due to the different work functions and contexts.

Employability skills embedded in this unit should be assessed holistically in the context of the job role and with other relevant units that make up the skill set or qualification.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the performance criteria is detailed below.

Security systems and procedures may deal with:

- customers
- staff
- keys
- visitors, sales representatives, contractors and vendors
- stock
- records
- cash, credit cards
- equipment, including:

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RANGE STATEMENT

- alarm systems
- video surveillance
- mirrors
- security tags

- locked and secure areas
- premises
- armed hold-up.

Store policy and procedures may relate to:

- security
- surveillance of merchandise
- reporting problems and faults.

Customers may include:

- people from a range of social, cultural and ethnic backgrounds and with varying physical and mental abilities.

Legislative requirements may include:

- privacy and confidentiality laws
- Trade Practices and Fair Trading Acts
- consumer law
- awards and agreements
- property offences
- credit laws
- reporting procedures
- criminal law.

Staff may include:

- management
- other staff members
- full-time, part-time and casual staff
- people from a range of social, cultural and ethnic backgrounds and with varying physical and mental abilities.

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Unit Sector(s)

Sector Cross-Sector

Competency field

Competency field Risk Management and Security

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SIRXRSK002A Maintain store security

Modification History

The version details of this endorsed unit are in the table below. The latest information is at the top.

Release	Comments
Second Release	Editorial updates

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to maintain store security in a retail environment. It involves implementing store policy and procedures to ensure store security, informing team members and providing ongoing supervision and training to facilitate awareness and detection of theft.

Application of the Unit

This unit applies to team leaders and supervisors who interpret, apply and monitor security procedures according to store policy, industry codes of practice, relevant legislation and statutory requirements. A person undertaking this role maintains frontline security as well as reporting security concerns and providing ongoing supervision and training for staff on security procedures.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Nil

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements and Performance Criteria

Element	Performance Criteria
Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
1. Monitor and maintain store security.	1.1. Implement ***store policy and procedures*** to ensure store security is maintained. 1.2. Monitor and review ***security procedures***, according to store policy and ***legislative requirements***. 1.3. Implement procedures to minimise theft of easily stolen merchandise. 1.4. Maintain security of cash, cash register and keys according to store policy. 1.5. Implement store procedures in regard to ***transactions***. 1.6. Inform ***team members*** of store policy and procedures in regard to security. 1.7. Provide team members with ***feedback*** in regard to implementation or non implementation of store security procedures. 1.8. Provide staff with ongoing supervision and ***training*** to facilitate awareness and detection of theft. 1.9. ***Report*** matters likely to affect store security, according to store policy.
2. Facilitate awareness and detection of theft.	2.1. Inform ***team members*** of store policy and procedures in regard to security. 2.2. Provide team members with ***feedback*** in regard to implementation or non implementation of store security procedures. 2.3. Provide staff with ongoing supervision and ***training*** to facilitate awareness and detection of theft.

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Required skills

- interpersonal skills to:
  - provide information, feedback and training to staff

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  - report relevant matters through clear and direct communication
  - ask questions to identify and confirm requirements
  - share information
  - give instructions
  - use and interpret non-verbal communication
  - provide team leadership
- literacy skills to:
  - interpreting and applying Work Health and Safety (WHS) documents
  - reporting procedures
  - analytical skills to evaluate performance analysis

Required knowledge

- store policy and procedures in regard to:
  - security
  - cash and non-cash transactions
  - external or internal theft
  - suspicious circumstances
  - armed robbery
  - staff security training
  - procedures for opening and closing premises
- relevant legislation and statutory regulations, particularly in relation to checking of customers' bags and purchases
- types of store alarm and security systems used in the retail industry

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • consistently applies store policy and procedures, industry codes of practice, relevant legislation and statutory requirements in regard to store security • accurately applies relevant legislation and statutory regulations particularly in regard to checking of customers' bags and purchases • interprets, applies and monitors security procedures in regard to: • cash handling, and cash and non-cash transactions

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- internal or external theft or suspicious circumstances
- armed robbery
- opening and closing premises
- implements store policy and procedures in regard to:
  - reporting on matters related to store security
  - staff security supervision and training.

Context of and specific resources for assessment

Assessment must ensure access to:

- a retail work environment
- relevant documentation, such as:
  - store policy and procedures in regard to security
  - legislation and statutory requirements
  - WHS legislation
- relevant equipment such as:
  - alarm systems
  - point-of-sale equipment
  - communication equipment.

Methods of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- third-party reports from a supervisor
- observation of performance in the workplace
- a role play
- customer feedback
- written or verbal questioning to assess knowledge and understanding
- review of portfolios of evidence and third-party workplace reports of on-the-job performance.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:

- SIRXOHS002A Maintain store safety.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the

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performance criteria is detailed below.

Store policy and procedures in regard to:	• security • checking bags • cash and non-cash transactions • surveillance of merchandise • reporting problems and faults.
Security procedures may deal with:	• customers • staff or staff property • visitors, sales representatives, contractors and vendors • stock • records • cash and cash movement • equipment • premises • opening and closing of premises • theft • armed robbery • events likely to endanger customers or staff.
Legislative requirements may include:	• privacy or confidentiality laws • Trade Practices and Fair Trading Acts • consumer law • awards or agreements • property offences • credit laws • reporting procedures • criminal law.
Transactions may include:	• cash • EFTPOS • cheques • credit cards or store cards • smart cards • lay-by • returns • exchanges • gift vouchers.
Team members may include:	• small work teams • store team • corporate team

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- full-time, part-time, casual or contract staff
- people with varying degrees of language and literacy
- people from a range of cultural, social and ethnic backgrounds
- people with a range of responsibilities and job descriptions.

Feedback may be given:

- verbally
- in writing
- in groups
- individually.

Training may include:

- mentoring or coaching
- off-the-job training
- on-the-job training.

Report may be:

- verbal
- written
- formal
- informal.

Unit Sector(s)

Cross-Sector

Competency field

Risk Management and Security

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SIRXSLS002A Advise on products and services

Modification History

The version details of this endorsed unit are in the table below. The latest information is at the top.

Release	Comments
Second Release	Editorial updates

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to apply a depth of specialist or general product knowledge and a need for experience and skill in offering advice to customers.

Application of the Unit

This unit applies to team member who develop, maintain and convey detailed and specialised product knowledge to customers and other staff in accordance with store policy and relevant legislation. Specialist sales personnel undertake this function.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Nil

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
1. Develop product and service knowledge.	1.1. Develop and maintain ***product knowledge*** according to ***store policy*** and ***legislative requirements***. 1.2. Convey product knowledge to other ***staff*** as required. 1.3. Research and apply comparisons between products and services. 1.4. Demonstrate knowledge of competitors' product and service range and ***pricing structure.***
2. Recommend specialised products or services.	2.1. Evaluate merchandise according to ***customer requirements***. 2.2. Demonstrate features and benefits of products and services to ***custome***r to create a buying environment. 2.3. Apply detailed specialised knowledge of product to provide accurate advice to customers.

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Required skills

- interpersonal skills to:
  - convey product knowledge to staff
  - apply knowledge to provide advice to customers
  - handle difficult customers through clear and direct communication
  - ask questions to identify and confirm requirements
  - share information
  - use language and concepts appropriate to cultural differences
  - use and interpret non-verbal communication
- literacy skills in regard to:
  - use a range of communication and electronic equipment
  - access relevant product and service information
  - interpret product information
  - interpret store policies and procedures

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    - record information
- numeracy skills to:
    - estimate and calculate costs relevant to pricing products

Required knowledge

- specialised product knowledge, including:
    - warranties
    - benefits and features
    - shelf life and use-by date
    - storage requirements
    - ingredients or materials contained in product
    - product and ingredient origins
    - care and handling of products
    - corresponding or complementary products and services
    - stock availability
- store and industry manuals and documentation
- stock and merchandise range
- service range
- store policies and procedures including:
    - procedures for taking orders
    - pricing procedures, including GST requirements
- relevant legislation and statutory requirements and industry code of practice relating to the retail industry

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • consistently applies store policies and procedures and industry codes of practice in regard to customer service and selling products and services • develops, maintains and conveys product knowledge to customers and other staff • applies detailed and specialised product knowledge to provide accurate advice according to the needs of the customer.
Context of and specific	Assessment must ensure access to:

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resources for assessment	• a retail work environment
	• a range of stock and merchandise
	• relevant documentation, such as:
	  • price lists
	  • policy and procedures manuals
	• a range of customers with different requirements
	• a range of communication equipment.

Methods of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • observation of the candidate in the workplace • third-party reports from a supervisor • customer feedback • answers to questions about specific skills and knowledge • review of portfolios of evidence and third-party workplace reports of on-the-job performance.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the performance criteria is detailed below.

Product knowledge may include:	• brand options • product features and benefits • warranties • safety features • use-by dates • handling and storage requirements • stock availability • price.
Product knowledge may be developed and maintained by:	• accessing the internet • attending product launches • attending product seminars • discussions with staff • accessing product information booklets and

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	pamphlets.
Store policy and procedures in regard to:	• interaction with customers • selling products and services.
Legislative requirements may include:	• Trade Practices and Fair Trading Acts • tobacco laws • liquor laws • lottery legislation • industry codes of practice • WHS • sale of second-hand goods • sale of X and R rated products • trading hours • transport, storage and handling of goods.
Staff may include:	• full-time, part-time or casual • under contract • people with varying degrees of language and literacy • people from a range of cultural, social and ethnic backgrounds • people with a range of responsibilities and job descriptions.
Customer requirements may include:	• specific brand • sizing • quality • quantity • price range • usage.
Customers may include:	• new or repeat contacts • external and internal contacts • customers with routine or special requests • people from a range of social, cultural and ethnic backgrounds and with varying physical and mental abilities.
Pricing structure may include:	• sales reductions • pricing procedures, including GST requirements • mark-downs.

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Unit Sector(s)

Cross-Sector

Competency field

Sales

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SITXMGT501 Establish and conduct business relationships

Modification History

The version details of this endorsed unit of competency set are in the table below. The latest information is at the top.

Version	Comments
1.0	E Replaces and is equivalent to SITXMGT006A Establish and conduct business relationships. Minor adjustments to expression of content to streamline and improve unit.

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to establish and manage positive business relationships. It requires the ability to use high-level communication and relationship building skills to conduct formal negotiations and make commercially significant business-to-business agreements.

Application of the Unit

This unit applies to all industry sectors, and to individuals who take responsibility for making decisions about purchasing or marketing activities. They also oversee the maintenance of contracts or agreements. This could include senior operational personnel, sales and marketing personnel, managers or owner-operators of small businesses. Agreements may relate to corporate accounts, service contracts, agency agreements, venue contracts, rate negotiations, preferred product agreements, supply agreements and marketing agreements.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements and Performance Criteria

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
1. Build business relationships.	1.1 Establish relationships within appropriate cultural context. 1.2 Build trust and respect in business relationships through use of effective communication skills and techniques. 1.3 Proactively identify and take up ***opportunities to maintain regular contact with customers and suppliers***.
2. Conduct negotiations.	2.1 Conduct negotiations in a professional manner in the relevant cultural context. 2.2 Conduct negotiations in the context of current organisation goals. 2.3 Maximise benefits for all ***parties*** through use of established ***negotiation techniques*** and in the context of establishing long term relationships. 2.4 Incorporate feedback and input from colleagues into negotiation where appropriate. 2.5 Communicate results of negotiations to appropriate colleagues and stakeholders within appropriate timeframes.
3. Make formal business agreements.	3.1 Confirm agreements in writing according to organisational requirements, using formal contracts where appropriate. 3.2 Obtain approvals for all aspects of formal agreements according to organisational procedures. 3.3 Evaluate and act on the need for specialist advice as required.
4. Foster and maintain business relationships.	4.1 Proactively seek, review and act upon information needed to maintain sound business relationships. 4.2 Honour agreements within scope of individual responsibility, complying with agreed terms. 4.3 Take account of agreed performance indicators. 4.4 Make adjustments to agreements in consultation with customer or supplier and share information with appropriate colleagues. 4.5 Nurture relationships through regular contact and use of

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effective interpersonal and communication styles.

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to:
  - conduct negotiations that may be of significant commercial value
  - establish and nurture ongoing professional relationships
- critical thinking skills to evaluate potentially complex internal and external issues that affect professional relationships and business negotiations
- initiative and enterprise skills to pro-actively seek opportunities for building business relationships
- literacy skills to:
  - read and interpret potentially complex agreements, conditions and contracts
  - develop or participate in the development of formal commercial agreements
- numeracy skills to evaluate commercial data and cost structures
- planning and organising skills to plan activities and initiatives that support professional relationships
- problem-solving skills to anticipate and respond to challenges in the negotiation process.

Required knowledge

- commercial context for business relationships in the relevant industry sector, including:
  - industry structure and interrelationships
  - sources of supply
  - distribution and marketing networks
  - professional networks
- principles of negotiation, stages in the negotiating process and different techniques that can be applied
- nature of agreements and contracts in the relevant industry sector and their key inclusions
- key components of contract law at an overview level, including:
  - terms and obligations of contract
  - methods of contractual agreement
  - exclusion clauses
  - dispute resolution clause
  - termination of contracts
- other legal requirements that impact negotiations and agreements in the relevant industry sector, including consumer protection.

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the ability to:

- establish and maintain business relationships over a period of time that allows for the demonstration of interpersonal and relationship building skills
- conduct formal negotiations and make and manage agreements and contracts in a specific business context
- demonstrate knowledge of industry structure and interrelationships, industry networks, and distribution and marketing networks
- demonstrate knowledge of the role and features of contracts in a given business operation or sector.

Context of and specific resources for assessment

Assessment must ensure use of:

- other people with whom business relationships can be established
- real or simulated sales or operational details for which contracts may be negotiated and agreed
- materials that support the negotiation process, such as preparatory facts, statistics, KPIs and market information.

Method of assessment

A range of assessment methods should be used to assess the practical skills and knowledge required to establish and conduct business relationships. The following examples are appropriate for this unit:

- direct observation of the individual participating in negotiations
- evaluation of negotiation activities undertaken by the individual, including:
  - planning and preparation
  - outcomes and reporting
  - agreements reached
- use of case studies to assess application of different techniques to different negotiating scenarios
- written or oral questioning to assess knowledge of industry structure and interrelationships, negotiating principles and techniques and legal compliance issues
- review of portfolios of evidence and third-party

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workplace reports of on-the-job performance by the individual.

Guidance information for assessment

The assessor should design integrated assessment activities to holistically assess this unit with other units relevant to the industry sector, workplace and job role, for example:

- SITTPPD401 Package tourism products
- SITTPPD601 Develop tourism products
- SITXINV601 Establish stock purchasing and control systems
- SITXMPR403 Plan and implement sales activities
- SITXMPR404 Coordinate marketing activities.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Opportunities to maintain regular contact with customers and suppliers may include:

- association membership
- cooperative promotions
- industry functions
- informal social occasions
- program of regular telephone contact
- social media.

Parties may be:

- cooperative partners
- customers
- suppliers.

Negotiation techniques may include:

- active listening and questioning
- appropriate cultural behaviour
- appropriate language
- bargaining
- clarification of needs of all parties
- confirming agreements
- developing options
- identification of Key Performance Indicators (KPIs), goals and limits
- identifying points of agreement and points of difference
- non-verbal communication techniques
- preparatory research of facts, statistics,

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KPIs and product usage rates.

Unit Sector(s)

Cross-Sector

Competency Field

Management and Leadership

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SITXMPR401 Coordinate production of brochures and marketing materials

Modification History

The version details of this endorsed unit of competency set are in the table below. The latest information is at the top.

Version	Comments
1.2	Correction to mapping to show non equivalence.
1.0	N Replaces and is not equivalent to SITXMPR001A Coordinate production of brochures and marketing materials. Minor adjustments to expression of content to streamline and improve unit. Added trade practices to Required knowledge. Added sustainability. More emphasis on physical and virtual.

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to coordinate the development process for brochures and other marketing materials from a content and production perspective.

Application of the Unit

This unit applies to all industry sectors and all types of marketing materials, both physical and virtual. People working independently with limited supervision undertake this role. Depending on the business context, this could include sales and marketing personnel, managers, and owner-operators of small businesses.

This unit reflects the general skills needed by those involved in sales and marketing activities and does not include the skills required by professional graphic designers or copywriters.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

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Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
1. Plan production of brochures and marketing materials.	1.1 Plan production of ***brochures and marketing materials*** according to marketing objectives. 1.2 Evaluate ***factors*** that impact nature of materials and the development process, including sustainability considerations. 1.3 Create production plans, including timelines, responsibilities, budget and contingency measures.
2. Produce information for inclusion.	2.1 Produce or obtain accurate and complete ***information for inclusion***. 2.2 Present information in a clear format. 2.3 Present information in a culturally appropriate way.
3. Obtain quotations for artwork and printing as appropriate.	3.1 Provide ***accurate and complete specifications*** to quoting organisations within appropriate timeframe. 3.2 Obtain quotations with details of potential variations to cost and conditions that may apply.
4. Develop final copy for brochures and marketing materials.	4.1 Develop copy using basic creative writing techniques or obtain from relevant source. 4.2 Integrate accurate, practical and operational details. 4.3 Present accurate information about costs and conditions. 4.4 Check copy for accuracy prior to submission for production.
5. Coordinate production of brochures and marketing	5.1 Liaise with production personnel and monitor schedule. 5.2 Check and correct production work as required. 5.3 Approve artwork according to organisational guidelines. 5.4 Obtain and deliver materials on schedule or action contingency

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materials. measures.

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to collaborate with others on technical, organisational and creative issues
- critical thinking skills to evaluate factors that impact on production of marketing materials
- literacy skills to:
  - read and interpret quotations and product conditions
  - proofread draft materials
  - create copy or check quality of outsourced copy
  - research information for inclusion from varied and potentially unfamiliar sources
- planning and organising skills to plan and coordinate all aspects of the production process
- problem-solving skills to respond to challenges that arise in the production of marketing materials
- numeracy skills to:
  - calculate costs and quantities of materials to be produced
  - work with numerical concepts of size, shape and layout
  - work with detailed product costings
- technology skills to:
  - liaise with others about technical production issues
  - work with current industry marketing technologies.

Required knowledge

- objectives of materials and the market for which material is required
- physical and virtual media marketing opportunities and factors that impact production of materials in those contexts
- current digital print production technologies, processes and terminology
- printing and industry conventions in relation to placement of information, page numbering and copyright information
- quality indicators in marketing material production, including:
  - readability
  - photographic quality
  - effective use of colour
  - spacing requirements
- creative writing techniques used for the content of brochures and other marketing materials
- procedures and requirements for preparation and proofing of material

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- copyright laws and restrictions that apply to the inclusion of certain content in brochures and other marketing materials
- procedures for copyright clearance of restricted materials
- trade practices requirements around the need for accuracy of information in marketing materials.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to: • coordinate all aspects of the development process and produce materials within specified deadlines • produce materials that meet stated objectives, provide current and accurate information, and are free of errors • demonstrate knowledge of current production processes, terminology and copyright restrictions.
Context of and specific resources for assessment	Assessment must ensure use of: • a real or simulated product or service for which brochures and marketing materials can be developed • current information and communications technology for the development of content • suppliers, such as graphic designers, print production organisations and copywriters with whom the individual can interact.
Method of assessment	A range of assessment methods should be used to assess the practical skills and knowledge required to coordinate the production of brochures and marketing materials. The following examples are appropriate for this unit: • evaluation of brochures or other physical or virtual marketing materials produced by the individual • written or oral questioning to assess knowledge of coordination and production processes, copyright laws and clearance procedures • review of portfolios of evidence and third-party workplace reports of on-the-job performance by the individual.
Guidance information for	The assessor should design integrated assessment activities

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assessment	to holistically assess this unit with other units relevant to the industry sector, workplace and job role, for example: • SITXMGT501 Establish and conduct business relationships • SITXMPR404 Coordinate marketing activities.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Brochures and marketing materials may include:	• advertising materials • conference programs and registration forms • destination guides • direct mail pieces • display materials • event prospectus • invitations • product brochures • product support manuals • promotional flyers and leaflets.

Factors for consideration during planning may relate to:	• accessibility, such as the need to provide materials in alternative formats
	• availability of information
	• design issues:
	  • style
	  • size
	• legal requirements
	• marketing considerations:
	  • distribution considerations
	  • market for review of competitive materials
	  • objectives
	• resource constraints:
	  • budget
	  • in-house capability
	• technology:
	  • digital media opportunities
	• objectives of the material

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	• sustainability considerations • time parameters.
Information for inclusion may be:	• advertisements • logos • maps • photos • special offers or incentives • sponsor messages • supplier information • tariff details.
Accurate and complete specifications include:	• conditions of contract • delivery platform • interactivity requirements • layout and style of text • number of colours • number of photographs • production and delivery deadlines • size • total number required • type of paper (for print-based materials).

Unit Sector(s)

Cross-Sector

Competency Field

Marketing and Public Relations

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SITXMPR402 Create a promotional display or stand

Modification History

The version details of this endorsed unit of competency set are in the table below. The latest information is at the top.

Version	Comments
1.0	N Replaces but is not equivalent to SITXMPR002A Create a promotional display or stand. Minor adjustments to expression of content to streamline and improve unit. Added elements and principles of design.

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to create a display or stand for the promotion of a product or service. It requires the ability to identify the objectives of the promotion, determine who the audience will be, select all display components and assemble the display or stand.

Application of the Unit

This unit applies to all industry sectors. People working with some level of independence create displays at promotional events or within their own workplaces. This includes sales and marketing personnel, managers, and owner-operators of small businesses. Displays may be used to promote any product, service, or event; a group of products being cooperatively marketed; or even a whole city, region or tourism precinct.

This unit does not cover the skills of a specialist display designer or visual merchandiser.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements and Performance Criteria

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
1. Make preparations for display or stand.	1.1 Identify display or stand objectives in consultation with appropriate colleagues. 1.2 Obtain operational ***information to assist in display or stand preparation*** to allow time for adequate planning. 1.3 Plan display or stand to meet target audience needs. 1.4 Select and organise adequate ***display supplies*** and transportation arrangements according to display plan. 1.5 Identify the need for and seek assistance from display specialists where appropriate.
2. Create the display.	2.1 Create or dress the display or stand, making creative use of available materials and supplies. 2.2 Consider the ***elements and principles of design*** in creating the display. 2.3 Use ***display techniques*** that maximise visual appeal of display and reflect the nature of product or service being sold. 2.4 Use display equipment correctly and safely. 2.5 Check display or stand to ensure safety of colleagues and customers.

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- critical thinking skills to evaluate options for creative display
- literacy skills to:
  - interpret information about the needs of the target audience and operational aspects of the display or stand

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- numeracy skills to work with concepts about size, space and layout
- planning and organising skills to coordinate practical and creative aspects of display creation
- visual literacy skills to work with the elements and principles of design.

Required knowledge

- industry contexts in which displays are used, including:
  - trade and consumer shows
  - shopping centre promotions
  - information centre displays
  - window displays
  - promotional functions
- materials and equipment used for display in different locations and settings, such as stages, exhibition booths, permanent displays and window displays
- elements and principles of design as they apply to the creation of displays
- visual merchandising techniques using commonly available materials, including techniques for maximising the effectiveness of collateral in displays, including brochures and posters
- work health and safety practices for transporting, carrying and assembling the display or stand
- safety issues associated with the construction and operation of promotional displays and stands in different venues.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to: • create a display or dress a promotional stand to meet specific objectives using accepted display techniques and working within typical workplace time constraints • apply the elements and principles of design • create display or stand in a well organised and safe manner.
Context of and specific resources for assessment	Assessment must ensure use of: • a display space or promotional stand • display and promotional materials used in the relevant industry sector.

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Method of assessment	A range of assessment methods should be used to assess the practical skills and knowledge required to create a promotional display or stand. The following examples are appropriate for this unit: • evaluation of the creativity and visual appeal of a display created by the individual • use of case studies to assess application of different display techniques to typical industry promotional situations • written or oral questioning to assess knowledge of different visual merchandising techniques, safety considerations • review of portfolios of evidence and third-party workplace reports of on-the-job performance by the individual.
Guidance information for assessment	The assessor should design integrated assessment activities to holistically assess this unit with other units relevant to the industry sector, workplace and job role, for example: • SITXCOM302 Make presentations • SITXMPR404 Coordinate marketing activities.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Information to assist in display or stand preparation may include:	• budget allocation • floor plans • nature of display area, including booth and stage • need for utilities, such as electricity and water • need for waste management • work health and safety requirements • security • set-up times and duration • type of surface on which display is to be created.
Display supplies may include:	• adhesives and velcro • audiovisual systems, including videos and sound systems • balloons and other decorations

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- collateral materials, such as brochures, posters, banners and organisational colours and logo
- computers
- floral arrangements and potted plants
- furniture
- mobiles
- pins
- scissors
- string.

Elements and principles of design may include:

- alignment
- balance
- coherence
- colour
- composition
- contrast
- direction
- dominance
- emphasis
- form
- line
- movement
- pattern
- proportion
- proximity
- repetition
- rhythm
- shape
- simplicity/complexity
- space (positive and negative)
- subordination
- texture
- unity.

Display techniques may include the use of:

- cultural artefacts
- fabric
- flags
- freestanding display options
- local produce
- printed materials
- product samples
- signs
- 3-D materials.

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Unit Sector(s)

Cross-Sector

Competency Field

Marketing and Public Relations

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SITXMPR404 Coordinate marketing activities

Modification History

The version details of this endorsed unit of competency set are in the table below. The latest information is at the top.

Version	Comments
1.2	Correction to mapping to show non equivalence.
1.0	N Replaces and is not equivalent to SITXMPR004A Coordinate marketing activities. Minor adjustments to expression of content to streamline and improve unit. Added innovation, legal, ethical and sustainability. Added more on new technologies and media.

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to plan and coordinate a range of marketing and promotional activities at an operational level. The unit incorporates knowledge of marketing principles.

Application of the Unit

This unit applies to all industry sectors, and to individuals who take responsibility for coordinating marketing activities within the parameters of an established marketing strategy. People working independently with limited supervision undertake this role. This could include marketing coordinators or managers and owner-operators of small businesses.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
1. Plan and organise marketing activities.	1.1 Plan ***marketing activities*** according to marketing plan or other organisational systems. 1.2 Identify, analyse and incorporate relevant market information and ***legal***, ***ethical and sustainability issues*** into short term planning. 1.3 Confirm target markets and marketing medium. 1.4 Evaluate ***potential and suitability*** of marketing opportunities that arise. 1.5 Proactively seek and evaluate innovative marketing opportunities, including use of new technologies and media. 1.6 Develop and implement action plans to address ***operational details***.
2. Undertake a general public relations role.	2.1 Establish and conduct positive relationships with industry and media colleagues. 2.2 Use networks to support marketing activities. 2.3 Develop public relations resources as required, including media releases and industry or media support materials.
3. Review and report on marketing activities.	3.1 Review activities according to agreed evaluation methods and incorporate results into future planning. 3.2 Prepare reports according to organisational policy and required timeframes. 3.3 Present current and clear market intelligence to inform sales and marketing planning.

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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to establish and conduct positive business relationships
- critical thinking skills to evaluate the potential of different marketing activities
- initiative and enterprise skills to proactively identify and respond to new opportunities
- literacy skills to:
  - interpret market trend information and marketing plans
  - develop detailed action plans for marketing activities
  - prepare media releases and marketing reports
- numeracy skills to work within marketing budgets
- planning and organising skills to coordinate diverse and unpredictable operational details
- problem-solving skills to proactively identify and respond to potentially complex implementation challenges
- self-management skills to take responsibility for the quality and outcomes of marketing activities
- technology skills to work with current web based marketing technologies.

Required knowledge

- content and structure of marketing plans
- key marketing principles, including the marketing management process and the four Ps - product, place, price and promotion
- industry structure and interrelationships, industry networks and information sources
- industry and market knowledge appropriate to the sector and organisation, including:
  - distribution and marketing networks, especially those that support the product or service being promoted, including e-business options and major promotional events
  - commission structures
  - current customer and market trends and preferences
- features, benefits and practical application of marketing activities commonly used in the service industries, including:
  - advertising
  - familiarisations
  - in-house promotions
  - public relations
  - social media
  - trade and consumer shows
  - signage and display
- legal issues that impact on the marketing of products and services, including consumer protection provisions
- ethical considerations for marketing activities, including:

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  - appropriate use of images and text
  - protection of children
  - targeting of particular groups in the community
- sustainability considerations for marketing activities, including:
  - reducing waste of printed materials
  - sustainability as a marketing tool.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to: • plan and coordinate multiple and different marketing activities for an operation, product or service • integrate knowledge of the relevant industry, including structure and interrelationships, industry networks, information sources, and distribution and marketing networks • integrate knowledge of the types of marketing activities used in the relevant industry sector and major industry promotional events • demonstrate knowledge of marketing principles and their application to practical workplace activities.
Context of and specific resources for assessment	Assessment must ensure use of: • real or simulated products or services for which the individual can conduct marketing activities • current information and communications technology used by industry for marketing activities • marketing plans and operational marketing documents, such as action plans and marketing reports.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • evaluation of marketing activities planned and conducted by the individual, including reports on lessons to be learned for future activities

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- evaluation of critiques prepared by the individual about industry marketing activities
- use of case studies to assess the application of marketing knowledge to different industry situations
- written or oral questioning to assess knowledge of marketing principles, structure of the industry, industry interrelationships, distribution networks and legal compliance issues
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the individual.

Guidance information for assessment

The assessor should design integrated assessment activities to holistically assess this unit with other units relevant to the industry sector, workplace and job role, for example:

- SITXMPR403 Plan and implement sales activities.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Marketing activities may include:

- advertising
- display and signage
- events
- familiarisations:
  - media
  - trade
- industry and public relations activities
- market research
- product development within scope of individual responsibility
- web-based and social media activities.

Information to be incorporated into the planning process may include:

- competitive activity
- financial statistics
- marketing reports
- marketplace trends
- sales reports.

Legal, ***ethical and sustainability issues*** may

- consumer law and trade practices

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relate to:	• work health and safety obligations • resource conservation • targeting of particular groups • ways of presenting information.

Potential and suitability of promotional activities may relate to:	• consistency with overall marketing direction
	• exposure to be achieved
	• matching of attendees to target markets
	• resource considerations:
	  • financial
	  • human
	• timing of the activity or event.

Operational details may include:	• administrative and procedural requirements • availability of promotional materials • available technology • contracting of other services, such as display • equipment requirements • need for external assistance • potential for cooperative approaches • public relations implications • staffing requirements and briefings • strategies to ensure maximum benefits • travel arrangements.

Unit Sector(s)

Cross-Sector

Competency Field

Marketing and Public Relations

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TAEASS401B Plan assessment activities and processes

Modification History

Version	Comments
TAEASS301B	Released with *TAE10 Training and Education Training Package version 2.0*

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to plan and organise the assessment process, including recognition of prior learning (RPL), in a competency-based assessment system. It also includes the development of simple assessment instruments.

Application of the Unit

This unit typically applies to assessors and workplace supervisors with assessment planning responsibilities; and trainers or other assessors responsible for planning assessment, including RPL.

The unit is suitable for those with an existing assessment strategy which documents the overall framework for assessment.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a	*Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text*

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ELEMENT	PERFORMANCE CRITERIA
unit of competency.	*is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.*

Elements and Performance Criteria

1. Determine assessment approach	1.1 Identify candidate and confirm ***purposes and context of assessment/RPL*** with relevant people according to l***egal, organisational and ethical requirements***
	1.2 Identify and access ***benchmarks for assessment/RPL*** and any specific assessment guidelines
2. Prepare the assessment plan	2.1 Determine evidence and ***types of evidence*** needed to demonstrate competence, according to the ***rules of evidence***
	2.2 Select ***assessment methods*** which will support the collection of defined evidence, taking into account the context in which the assessment will take place
	2.3 Document all aspects of the ***assessment plan*** and confirm with relevant personnel
3. Develop assessment instruments	3.1 Develop ***simple assessment instruments*** to meet target group needs
	3.2 Analyse ***available assessment instruments*** for their suitability for use and modify as required
	3.3 ***Map assessment*** instruments against unit or course requirements
	3.4 Write clear instructions for candidate about the use of the instruments
	3.5 Trial draft assessment instruments to validate content and applicability, and record outcomes

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- cognitive interpretation skills to:
  - interpret competency standards and other assessment documentation, including material

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relating to reasonable adjustment
    - identify opportunities for integrated competency assessment
    - contextualise competency standards to the operating assessment environment, including RPL
    - consider access and equity needs of diverse candidates
- technology skills to use appropriate equipment and software to communicate effectively with others
- research and evaluation skills to:
    - obtain competency standards, assessment tools and other relevant assessment resources
    - research candidate characteristics and any reasonable adjustment needs
    - evaluate feedback, and determine and implement improvements to processes
- literacy skills to read and interpret relevant information to design and facilitate assessment and recognition processes
- communication skills to discuss assessment, including RPL processes with clients and other assessors
- interpersonal skills to:
    - demonstrate sensitivity to access and equity considerations and candidate diversity
    - promote and implement equity, fairness, validity, reliability and flexibility in planning an assessment processes.
- **Required knowledge**
- ethical and legal requirements of an assessor
- competency-based assessment, including:
    - work focused
    - criterion referenced
    - standards based
    - evidence based
- different purposes of assessment and different assessment contexts, including RPL
- how to read and interpret the identified competency standards as the benchmarks for assessment
- how to contextualise competency standards within relevant guidelines
- four principles of assessment and how they guide the assessment process
- purpose and features of evidence, and different types of evidence used in competency-based assessments, including RPL
- rules of evidence and how they guide evidence collection
- different types of assessment methods, including suitability for collecting various types of evidence
- assessment instruments and their purpose; different types of instruments; relevance of different instruments for specific evidence-gathering opportunities.

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	

Critical aspects for assessment and evidence required to demonstrate competency in this unit	• Evidence of the ability to:
	• plan and organise the assessment process on a minimum of two occasions
	• collect evidence that demonstrates:
	  • documented assessment plans
	  • having covered a range of assessment events
	  • catering for a number of candidates
	  • different competency standards or accredited curricula
	  • an RPL assessment
	  • contextualisation of competency standards and the selected assessment tools, where required
	  • incorporation of reasonable adjustment strategies
	  • development of simple assessment instruments for use in the process
	  • organisational arrangements.

Context of and specific resources for assessment	Evidence must be gathered in the workplace wherever possible. Where no workplace is available, a simulated workplace must be provided. Assessment must ensure access to training products, such as training packages and accredited course documentation.
Method of assessment	
Guidance information for assessment	

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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Purposes of assessment/ RPL may include:	• recognising current existing competence of candidates • determining if competence has been achieved following learning • establishing candidate progress towards achievement of competence • determining language, literacy and numeracy needs of candidates • certifying competence through a qualification or Statement of Attainment • licensing or regulatory requirements.

Context of assessment/ RPL may include:	• environment in which the assessment/RPL will be carried out, including real or simulated workplace
	• opportunities for collecting evidence in a number of situations
	• relationships between competency standards and:
	  • evidence to support RPL
	  • work activities in the candidate's workplace
	  • learning activities
	• who carries out the assessment/RPL.

Organisational, legal and ethical requirements may include:	• assessment system policies and procedures
	• assessment strategy requirements
	• reporting, recording and retrieval systems for assessment, including RPL
	• quality assurance systems
	• business and performance plans
	• access and equity policies and procedures
	• collaborative and partnership arrangements
	• defined resource parameters
	• mutual recognition arrangements
	• industrial relations systems and processes, awards, and enterprise agreements
	• Australian Quality Training Framework
	• registration scope
	• human resources policies and procedures
	• legal requirements, including:
	  • anti-discrimination
	  • equal employment opportunity
	  • job role, responsibilities and conditions
	• relevant industry codes of practice
	• confidentiality and privacy requirements
	• OHS considerations, including:
	  • ensuring OHS requirements are adhered to during the

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	assessment process • identifying and reporting OHS hazards and concerns to relevant personnel.
Benchmarks for assessment/RPL may include:	• criterion against which the candidate is assessed or prior learning recognised, which may be: • competency standard/unit of competency • assessment criteria of course curricula • performance specifications of an enterprise or industry • product specifications.
Types of evidence may include:	• direct • indirect • supplementary.
Rules of evidence ensure that evidence collected is:	• valid • sufficient • authentic • current.
Assessment methods are the particular techniques used to gather evidence and may include:	• direct observation, for example: • real work/real time activities at the workplace • work activities in a simulated workplace environment • structured activities, for example: • simulation exercises and role-plays • projects • presentations • activity sheets • questioning, for example: • written questions, e.g. on a computer • interviews • self-assessment • verbal questioning • questionnaires • oral or written examinations (applicable at higher AQF levels) • portfolios of evidence, for example: • collection of work samples compiled by candidate • product with supporting documentation • historical evidence • journal or log book • information about life experience • review of products, for example: • testimonials and reports from employers and supervisors

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	• evidence of training • authenticated prior achievements • interview with employer, supervisor, or peer.
Assessment plan may include:	• overall planning document describing: • what is to be assessed • when assessment is to take place • where assessment is to take place • how assessment is to take place.
Simple assessment instruments may include:	• instruments developed by an assessor as part of formative or summative assessment activities, including: • profiles of acceptable performance measures • templates and proformas • specific questions or activities • evidence and observation checklists • checklists for the evaluation of work samples • recognition portfolios • candidate self-assessment materials • instruments developed elsewhere that have been modified by the assessor for use with a particular client group.
Available assessment instruments may include:	• commercially available instruments • those created by others inside the registered training organisation.
Map assessment means:	• showing a clear relationship between the evidence and the requirements of the unit.

Unit Sector(s)

Assessment

Custom Content Section

Not applicable.

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TAEASS402B Assess competence

Modification History

Version	Comments
TAEASS402B	Released with *TAE10 Training and Education Training Package version 2.0*

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to assess the competence of a candidate.

Application of the Unit

This unit typically applies to assessors.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency.	*Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.*

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Elements and Performance Criteria

1. Prepare for assessment	1.1 Interpret ***assessment plan*** and confirm organisational, legal and ethical requirements for conducting assessment with relevant people 1.2 Access and interpret relevant ***benchmarks for assessment*** and nominated ***assessment tools*** to confirm the requirements for evidence to be collected 1.3 Arrange identified material and physical resource requirements according to assessment system policies and procedures 1.4 Organise ***specialist support*** required for assessment 1.5 Explain, discuss and agree details of the assessment plan with candidate
2. Gather quality evidence	2.1 Use agreed ***assessment methods*** and instruments to gather, organise and document evidence in a format suitable for determining competence 2.2 Apply the principles of assessment and rules of evidence in gathering quality evidence 2.3 Determine opportunities for evidence gathering in actual or simulated activities through consultation with the candidate and relevant personnel 2.4 Determine opportunities for integrated assessment activities and document any changes to assessment instruments where required
3. Support the candidate	3.1 Guide candidates in gathering their own evidence to support recognition of prior learning (RPL) 3.2 Use appropriate communication and interpersonal skills to develop a professional relationship with the candidate that reflects sensitivity to ***individual differences*** and enables two-way ***feedback*** 3.3 Make decisions on reasonable adjustments with the candidate, based on candidate's needs and characteristics 3.4 Access required specialist support in accordance with the assessment plan 3.5 Address any OHS risk to person or equipment immediately
4. Make the assessment decision	4.1 Examine collected evidence and evaluate it to ensure that it reflects the evidence required to demonstrate competence 4.2 Use judgement to infer whether competence has been demonstrated, based on the available evidence 4.3 Make assessment decision in line with agreed assessment procedures and according to agreed assessment plan 4.4 Provide clear and constructive feedback to candidate regarding

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	the assessment decision and develop any follow-up action plan required
5. Record and report the assessment decision	5.1 Record assessment outcomes promptly and accurately 5.2 Complete and process an assessment report according to agreed assessment procedures 5.3 Inform other relevant parties of the assessment decision according to confidentiality conventions
6. Review the assessment process	6.1 Review the assessment process in ***consultation*** with relevant people to improve own future practice 6.2 Document and record the review according to relevant assessment system policies and procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- analysis and interpretation skills to:
  - break down competency standards
  - interpret assessment tools and other assessment information, including those used in RPL
  - identify candidate needs
  - make judgements based on assessment of available evidence
- observation skills to:
  - recognise candidate's prior learning
  - determine candidate's performance
  - identify when candidate may need assistance during the assessment processes
- research and evaluation skills to:
  - access required human and material resources for assessment
  - access assessment system policies and procedures
  - access RPL policies and procedures
  - evaluate evidence
  - evaluate assessment process
- cognitive skills to:
  - weigh up the evidence and make a judgement
  - consider and recommend reasonable adjustments
- decision-making skills to:
  - recognise a candidate's prior learning

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    - make a decision on a candidate's competence
- literacy skills to:
    - read and interpret relevant information to conduct assessment
    - prepare required documentation and records or reports of assessment outcomes in required format
- communication and interpersonal skills to:
    - explain the assessment, including RPL process
    - give clear and precise instructions
    - ask effective questions
    - provide clarification
    - discuss process with other relevant people
    - give appropriate feedback
    - discuss assessment outcome
    - use language appropriate to candidate and assessment environment
    - establish a working relationship with candidate.

Required knowledge

- competency-based assessment, including:
    - vocational education and training as a competency-based system
    - criterion-referenced assessment as distinct from norm-referenced assessment
    - competency standards as the basis of qualifications
    - structure and application of competency standards
    - principles of assessment and how they are applied
    - rules of evidence and how they are applied
    - range of assessment purposes and assessment contexts, including RPL
    - different assessment methods, including suitability for gathering various types of evidence, suitability for content of units, and resource requirements and associated costs
    - reasonable adjustments and when they are applicable
    - types and forms of evidence, including assessment instruments that are relevant to gathering different types of evidence used in competency-based assessment, including RPL
    - potential barriers and processes relating to assessment tools and methods
    - assessment system, including policies and procedures established by the industry, organisation or training authority
- RPL policies and procedures established by the organisation
- cultural sensitivity and equity considerations
- relevant policy, legislation, codes of practice and national standards, including commonwealth and state or territory legislation that may affect training and assessment in the vocational education and training sector, such as:
    - copyright and privacy laws in terms of electronic technology
    - security of information

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  - plagiarism
  - training packages and competency standards
  - licensing requirements
  - industry and workplace requirements
  - duty of care under common law
  - recording information and confidentiality requirements
  - anti-discrimination, including equal employment opportunity, racial vilification and disability discrimination
  - workplace relations
  - industrial awards and enterprise agreements
- OHS responsibilities associated with assessing competence, such as:
  - requirements for reporting hazards and incidents
  - emergency procedures
  - procedures for use of relevant personal protective equipment
  - safe use and maintenance of relevant equipment
  - sources of OHS information.
-

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to:
	• assess competence of a number of candidates within the vocational education and training context against different units of competency or accredited curricula, following the relevant assessment plan
	• assess at least one candidate for RPL
	• consider reasonable adjustment and the reasons for decisions in at least one assessment
	• cover an entire unit of competency and show:
	  • the application of different assessment methods and instruments involving a range of assessment activities and events
	  • two-way communication and feedback
	  • how judgement was exercised in making the assessment decision
	  • how and when assessment outcomes were recorded and reported

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	• assessment records and reports completed in accordance with assessment system and organisational, legal and ethical requirements • how the assessment process was reviewed.
Context of and specific resources for assessment	Evidence must be gathered in the workplace whenever possible. Where no workplace is available, a simulated workplace must be provided.
Method of assessment	
Guidance information for assessment	

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Assessment plan may include:	• overall planning, describing:
	  • what is to be assessed
	  • when assessment is to take place
	  • where assessment is to take place
	  • how assessment is to take place.

Benchmarks for assessment:	• refer to a criterion against which the candidate is assessed • may be a competency standard/unit of competency, assessment criteria of course curricula, performance specifications, or product specifications.
Assessment tools include:	• the learning or competency unit(s) to be assessed • the target group, context and conditions for the assessment • the tasks to be administered to the candidate • an outline of the evidence to be gathered from the candidate • the evidence criteria used to judge the quality of performance (i.e. the assessment decision-making rules) • the administration, recording and reporting requirements • the evidence of how validity and reliability have been tested and built into the design and use of the tool.

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Specialist support may include:	• assistance by third party, such as carer or interpreter • support from specialist educator • provision of developed online assessment activities • support for remote or isolated candidates and assessors • support from subject matter or safety experts • advice from regulatory authorities • assessment teams and panels • support from lead assessors • advice from policy development experts.

Assessment methods include:	• particular techniques used to gather different types of evidence, such as:
	  • direct observation
	  • structured activities
	  • oral or written questioning
	  • portfolios of evidence
	  • review of products
	  • third-party feedback.

Individual differences may include:	• English language, literacy and numeracy barriers • physical impairment or disability • intellectual impairment or disability • medical condition that may impact on assessment, such as arthritis, epilepsy, diabetes and asthma • learning difficulties • mental or psychological disability • religious and spiritual observances • cultural images and perceptions • age • gender.
Feedback may include:	• ensuring assessment/RPL process is understood • ensuring candidate concerns are addressed • enabling questions and answers • confirming outcomes • identifying further evidence to be provided • discussing action plans • confirming gap training needed • providing information regarding available appeal processes • suggesting improvements in evidence gathering and

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	presentation.
Consultation may involve:	• moderation with other assessors, or training and assessment coordinators • discussions with client, team leaders, managers, RPL coordinators, supervisors, coaches and mentors • technical and subject experts • English language, literacy and numeracy experts.

Unit Sector(s)

Assessment

Custom Content Section

Not applicable.

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TAEASS403B Participate in assessment validation

Modification History

Version	Comments
TAEASS403B	Released with *TAE10 Training and Education Training Package version 2.0*

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to participate in an assessment validation process.

Application of the Unit

This unit typically applies to those participating in assessment validation. It does not address leading the validation process.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency.	*Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.*

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Elements and Performance Criteria

1. Prepare for validation	1.1 Discuss and confirm the approach to validation according to defined purposes, context, and relevant ***assessment system policies and procedures***
	1.2 Analyse relevant ***benchmarks for assessment*** and agree on the evidence needed to demonstrate competence
	1.3 Arrange ***materials*** for ***validation activities***
2. Contribute to validation process	2.1 Demonstrate active ***participation*** in validation sessions and activities using appropriate communication skills
	2.2 Participate in validation sessions and activities by applying the principles of assessment and rules of evidence
	2.3 Check all documents used in the validation process for accuracy and version control
3. Contribute to validation outcomes	3.1 Collectively discuss validation findings to support improvements in the quality of assessment
	3.2 Discuss, agree and record recommendations to improve assessment practice
	3.3 Implement changes to own assessment practice, arising from validation

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- planning skills to participate in validation activities within agreed timeframes
- problem-solving skills to identify information that is inconsistent, ambiguous or contradictory
- evaluation skills to:
  - determine evidence requirements from competency standards
  - review assessment process, tools and methods
  - review collected evidence
- communication skills to share information in validation meetings.

Required knowledge

- how to interpret competency standards and other related assessment information to determine the evidence needed to demonstrate competence, including:
  - criterion-referenced assessment as distinct from norm-referenced assessment

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  - various reasons for carrying out validation and the different approaches to validation that may be appropriate before, during and after assessment
  - critical aspects of validation, including validation of assessment processes, methods and products
  - relevant OHS legislation, codes of practice, standards and guidelines, impacting on assessment
  - legal and ethical requirements of assessors, particularly in relation to validation activities
- principles of assessment
- rules of evidence.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to: • actively participate in a minimum of two validation sessions or meetings which, in combination, address the critical aspects of validation using different validation approaches and activities • clearly explain purposes of validation and the legal and ethical responsibilities of assessors • collate documentation relating to validation process in a logical manner • demonstrate communication and liaison with relevant people • provide feedback and interpret documentation in validation sessions • record contribution to validation findings.
Context of and specific resources for assessment	Evidence must be gathered in the workplace wherever possible. Where no workplace is available, a simulated workplace must be provided. Assessment must ensure access to: • assessment reports and records • other documentation relevant to validation.
Method of assessment	
Guidance information	

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for assessment	

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Assessment system policies and procedures may include:	• candidate selection • rationale and purpose of competency-based assessment • assessment records, and data and information management • recognition of current competency, recognition of prior learning and credit arrangements • assessment reporting procedures • assessment appeals • candidate grievances and complaints • validation • evaluation and internal audit • costs and resourcing • access and equity, and reasonable adjustment • partnership arrangements • links with human resource or industrial relations system • links with overall quality management system.
Benchmarks for assessment:	• refers to criterion against which the candidate is assessed • may be one or more units of competency or assessment criteria of course curricula.
Materials may include:	• assessment tools • samples of collected evidence • documentation outlining the basis of assessment decisions • reports and records of assessment decisions • samples of benchmarks of appropriate evidence • Assessment Guidelines of the relevant training packages • information from the evidence guide of the relevant units of competency.

Validation activities may include:	• analysing and reviewing:
	  • assessment tools
	  • collected evidence
	  • assessment decisions and records of assessment outcomes

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	• other aspects of assessment policies, processes and outcomes • recording evidence of validation processes and outcomes.
Participation may include comparison and evaluation of:	• assessment practices • assessment plans • interpretation of units of competency • assessment methods and instruments • assessment decisions • collected evidence.

Unit Sector(s)

Assessment

Custom Content Section

Not applicable.

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TAEDEL301A Provide work skill instruction

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to conduct individual and group instruction and demonstrate work skills, using existing learning resources in a safe and comfortable learning environment. The unit covers the skills and knowledge required to determine the success of both the training provided and one's own personal training performance. It emphasises the training as being driven by the work process and context.

Application of the Unit

Application of the unit	This unit supports a wide range of applications across any workplace setting and so can be used by any organisation. Its use is not restricted to training organisations.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Organise instruction and demonstration	1.1. Gather information about ***learner characteristics*** and learning needs 1.2. Confirm a ***safe learning environment*** 1.3. Gather and check ***instruction and demonstration objectives*** and seek assistance if required 1.4. Access and review relevant ***learning resources*** and ***learning materials*** for suitability and relevance, and seek assistance to interpret the contextual application 1.5. Organise access to necessary equipment or physical resources required for instruction and demonstration 1.6. Notify learners of ***details*** regarding the implementation of the learning program and/or delivery plan
2. Conduct instruction and demonstration	2.1. Use interpersonal skills with learners to establish a safe and comfortable learning environment 2.2. Follow the learning program and/or delivery plan to cover all learning objectives 2.3. Brief learners on any ***OHS procedures*** and requirements prior to and during training 2.4. Use ***delivery techniques*** to structure, pace and enhance learning 2.5. Apply ***coaching*** techniques to assist learning 2.6. Use communication skills to provide information,

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ELEMENT	PERFORMANCE CRITERIA
	instruct learners and demonstrate relevant work skills 2.7. Provide opportunities for practice during instruction and through work activities 2.8. Provide and discuss feedback on learner performance to support learning
3. Check training performance	3.1. Use ***measures*** to ensure learners are acquiring and can use new technical and generic skills and knowledge 3.2. Monitor learner progress and outcomes in consultation with learner 3.3. Review relationship between the trainer/coach and the learner and adjust to suit learner needs
4. Review personal training performance and finalise documentation	4.1. Reflect upon personal performance in providing instruction and demonstration, and document strategies for improvement 4.2. Maintain, store and secure learner records according to organisational and legal requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- verbaland non-verbal communication techniques, such as:
  - asking relevant and appropriate questions
  - providing explanations
  - demonstrating
  - using listening skills
  - providing information clearly
- safety skills to implement OHS requirements, by acting and responding safely in order to:
  - identify hazards
  - conduct prestart-up checks if required
  - observe and interpret learner behaviour that may put people at risk
- time-management, skills to:

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REQUIRED SKILLS AND KNOWLEDGE

- ensure all learning objectives are covered
- pace learning

- reflection skills in order to:
  - identify areas for improvement
  - maintain personal skill development
- literacy skills to:
  - complete and maintain documentation
  - read and follow learning programs and plans
  - read and analyse learner information
- technology skills to operate audio-visual and technical equipment
- interpersonal skills to:
  - engage, motivate and connect with learners
  - provide constructive feedback
  - maintain appropriate relationships
  - establish trust
  - use appropriate body language
  - maintain humour
  - demonstrate tolerance
  - manage a group
  - recognise and be sensitive to individual difference and diversity
- observation skills to:
  - monitor learner acquisition of new skills, knowledge and competency requirements
  - assess learner communication and skills in interacting with others
  - identify learner concerns
  - recognise learner readiness to take on new skills and tasks

Required knowledge

- learner characteristics and needs
- content and requirements of the relevant learning program and/or delivery plan
- sources and availability of relevant learning resources and learning materials
- content of learning resources and learning materials
- training techniques that enhance learning and when to use them
- introductory knowledge of learning principles and learning styles
- key OHS issues in the learning environment, including:
  - roles and responsibilities of key personnel
  - responsibilities of learners
  - relevant policies and procedures, including hazard identification, risk assessment, reporting requirements, safe use of equipment and emergency

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REQUIRED SKILLS AND KNOWLEDGE
procedures • risk controls for the specific learning environment

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment must address the scope of this unit and reflect all components of the unit. A range of appropriate assessment methods and evidence-gathering techniques must be used to determine competency. A judgement of competency should only be made when the assessor is confident that the required outcomes of the unit have been achieved and that consistent performance has been demonstrated.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to:
	• carry out aminimum of three training sessions, involving demonstrating and instructing particular work skills for different groups; with each session addressing:
	  • different learning objectives
	  • a range of techniques and effective communication skills appropriate to the audience.

Context of and specific resources for assessment	Evidence must be gathered in the workplace wherever possible. Where no workplace is available, a simulated workplace must be provided.
Method of assessment	
Guidance information for assessment	For further information about assessment of this and other TAE units, refer to relevant implementation guidance published on the IBSA website (www.ibsa.org.au).

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Learner characteristics may include:	• language, literacy and numeracy levels • learning styles • past learning and work experiences • specific needs • workplace culture.
Safe learning environment may include:	• exit requirements • personal protective equipment • safe access • safe use of equipment.

Instruction and demonstration objectives may include:	• competencies to be achieved
	• generic and technical skills, which may be:
	  • provided by the organisation
	  • developed by a colleague
	  • individual or group objectives
	  • learning outcomes.

Learning resources may include:	• any material used to support learning, such as:
	  • learner and user guides
	  • trainer and facilitator guides
	  • example training programs
	  • specific case studies
	  • professional development materials
	  • assessment materials
	• a variety of formats
	• those produced locally
	• those acquired from other sources.

Learning materials may include:	• handouts for learners • materials sourced from the workplace, e.g. workplace documentation, operating procedures, and specifications.
Details may include:	• location and time • outcomes of instruction or demonstration • reason for instruction or demonstration • who will be attending instruction session.

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RANGE STATEMENT	
OHS procedures may include:	• emergency procedures • hazards and their means of control • incident reporting • use of personal protective equipment • safe work practices • safety briefings • site-specific safety rules.
Delivery techniques may include:	• coaching • demonstration • explanation • group or pair work • providing opportunities to practise skills and solve problems • questions and answers.
Coaching may include:	• learning arrangements requiring immediate interaction and feedback • on-the-job instruction and 'buddy' systems • relationships targeting enhanced performance • short-term learning arrangements • working on a one-to-one basis.
Measures may include:	• informal review or discussion • learner survey • on-the-job observation • review of peer coaching arrangements.

Unit Sector(s)

Unit sector	Delivery and facilitation

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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TLIA5058A Manage facility and inventory requirements

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

This unit involves the skills and knowledge required to manage a facility and its inventory requirements. It includes identifying space, safety and security requirements; developing a documentation system; designing storage zones; and evaluating facility utilisation. Licensing, legislative, regulatory or certification requirements are applicable to this unit.

Application of the Unit

Application of the Unit

Work may be undertaken in various contexts within the transport and logistics industry.

This unit generally applies to those who provide leadership of others individually or in teams.

This unit is normally packaged at AQF V or above.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Identify space requirements	1.1 The medium-term and long-term storage needs of the organisation are assessed to facilitate planning in accordance with the business plan of the enterprise and legislative requirements
	1.2 Product type, picking frequencies, value, fragility, weight, handling characteristics, quantity and holding periods are assessed to consider type and amount of storage
	1.3 Facility is assessed to determine the stock holding and handling requirements for each inventory item
	1.4 Volume requirements are calculated to ensure that ongoing stock holding needs are met
	1.5 The total space requirement is calculated and used to formulate plan for space utilisation
2 Identify safety and security requirements	2.1 An assessment is made of risks to ensure maximum safety and security for personnel, stock and facilities
	2.2 Storage handling security and incident/emergency procedures for each class or type of product are identified and documented
	2.3 Fire prevention and firefighting systems are identified in accordance with building code regulations and storage material requirements
	2.4 An evacuation plan is developed in accordance with the safety program of the enterprise
3 Develop documentation system	3.1 A system for recording and tracing stock location, receival, throughput and despatch is developed and implemented to enable reporting, quality assurance and financial requirements to be met
	3.2 A system for recording communication with carriers, customers and employees is developed and implemented to assess operational effectiveness and to provide data for system improvement
4 Design storage zones	4.1 Space requirements and equipment operation are accurately assessed to facilitate the planning of warehouse zones
	4.2 An assessment is made of the facility to enable the most

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ELEMENT	PERFORMANCE CRITERIA
	effective use of available space
	4.3 Positioning of storage areas, bays, work stations and the like is undertaken in accordance with data obtained from the planning process
	4.4 Provision for maintenance and cleaning is catered for
5 Evaluate facility utilisation	5.1 A continual system of review is used involving regular checks to ensure storage areas and systems are functioning at optimum levels
	5.2 Receiving and despatch systems provide efficient operations
	5.3 Storage and handling systems provide ease of access and comply with ergonomic principles
	5.4 Product handling and storage minimises product damage, contamination and stock losses
	5.5 Facility layout remains sufficiently flexible to meet changing storage and handling requirements
	5.6 Appropriate reporting systems are established and used to maintain data for the design of improved facilities and systems

Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

Required knowledge:

- Relevant sections of national and state or territory regulatory requirements and codes of practice, including knowledge of fire safety and building regulations applicable to the facility
- Relevant OH&S and environmental procedures and regulations
- Focus of operation of warehouse systems, resources, management and workplace operating systems
- Enterprise business policies and plans including procedures for operations of the facility
- Throughput and storage requirements for specific types of inventory
- Principles, purpose and location of controls, monitoring devices, and systems
- Selection and appropriate application of technology, information systems and procedures
- Procedures for operating electronic communications equipment
- Requirements for completing relevant documentation
- Procedures for managing and controlling hazardous situations when carrying out work activities, particularly those that relate to the storage of materials

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REQUIRED KNOWLEDGE AND SKILLS

- Procedures to be followed in the event of an emergency

Required skills:

- Communicate effectively with others when managing facility and inventory requirements
- Read and interpret plans, diagrams, regulations, codes of practice and other documentation relevant to the management of facilities and inventory requirements
- Provide leadership to others when managing facilities and inventory requirements
- Adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions with others
- Promptly report and or rectify any identified problems that may arise during the planning and management of facilities and inventory requirements
- Develop and implement contingency plans for unplanned events which may arise during the management of facilities and inventory requirements
- Prioritise work and coordinate the work of others
- Apply precautions and required action to minimise, control or eliminate hazards that may exist during work activities
- Select and apply appropriate technology, information systems and procedures when managing facility and inventory requirements

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	• The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria of this unit and include demonstration of applying:
	  • the underpinning knowledge and skills
	  • relevant legislation and workplace procedures
	  • other relevant aspects of the range statement

Context of and specific resources for assessment	• Performance is demonstrated consistently over a period of time and in a suitable range of contexts • Resources for assessment include: • a range of relevant exercises, case studies and/or

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EVIDENCE GUIDE

	other simulated practical and knowledge assessment, and/or • access to an appropriate range of relevant operational situations in the workplace • In both real and simulated environments, access is required to: • relevant and appropriate materials and equipment, and • applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
Method of assessment	• Assessment of this unit must be undertaken by a registered training organisation • As a minimum, assessment of knowledge must be conducted through appropriate written/oral tests • Practical assessment must occur: • through activities in an appropriately simulated environment at the registered training organisation, and/or • in an appropriate range of situations in the workplace

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

The workplace environment may involve:	• twenty four hour operation • single and multi site location • large, medium and small companies
Depending on the organisation concerned, workplace procedures may be called:	• standard operating procedures (SOPs) • company procedures • enterprise procedures • organisational procedures • established procedures
Communication in the work area may include:	• phone • electronic data interchange (EDI) • fax

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RANGE STATEMENT

Consultative processes may involve:	• email • internet • RF systems • oral, aural or signed communications • other employees and supervisors • relevant authorities and institutions • management and union representatives • industrial relations and OH&S specialists • customers and suppliers • other professional or technical staff, contractors and maintenance personnel
Documentation and records may include:	• regulations and codes of practice relevant to the functions of a storage facility, including the ADG code, fire safety and firefighting regulations, building code regulations, storage and handling procedures, and security procedures relevant to the specific facility • relevant OH&S and environmental protection regulations • quality assurance procedures • emergency procedures, particularly in relation to fire and evacuation • operations manuals, job specifications and induction documentation • relevant Australian Standards and certification requirements
Applicable legislation and regulations may include:	• Australian and international regulations and codes of practice for the transport of dangerous goods and hazardous substances • relevant state/territory OH&S and environmental protection legislation • building codes, fire safety and firefighting codes and regulations

Unit Sector(s)

Not Applicable

Competency Field

Competency Field A - Handling Cargo/Stock

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TLID2010A Operate a forklift

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

This unit involves the skills and knowledge required to operate a forklift, including checking forklift condition, driving the forklift to fulfil operational requirements, monitoring site conditions, and monitoring and maintaining forklift performance. Assessment of this unit will usually be undertaken within a licensing examination conducted by, or under the authority of, the relevant state/territory OH&S authority. Licensing, legislative, regulatory or certification requirements are applicable to this unit.

Application of the Unit

Application of the Unit

Operation of a forklift must be carried out in compliance with the licence requirements and regulations of the relevant state/territory authority.

Operation of a forklift is performed under some supervision, generally within a team environment. It involves the application of routine equipment operation principles and procedures to maintain the safety and operation of a forklift in a variety of operational contexts.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

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Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Check forklift condition	1.1 Condition of forklift is checked for compliance with OH&S and workplace requirements for warning devices, manufacturers specifications and the nature of the load shifting task
	1.2 Attachments are checked to ensure appropriate adjustment and operation
	1.3 Mirrors and seats are adjusted for safe operation by the driver
	1.4 Log books are checked and appropriate workplace documentation is completed in accordance with workplace requirements
2 Drive the forklift	2.1 Forklift is started, steered, manoeuvred, positioned and stopped in accordance with regulations and manufacturers instructions
	2.2 Engine power is managed to ensure efficiency and performance and to minimise engine and gear damage
	2.3 Operational hazards are identified and/or anticipated and avoided or controlled through defensive driving and appropriate hazard control techniques
	2.4 Forklift is driven in reverse, maintaining visibility and achieving accurate positioning
	2.5 The forklift is parked, shut down and secured in accordance with manufacturers specifications, regulations and workplace procedures
3 Operate a forklift to handle loads	3.1 The lifting task to be undertaken is appropriately planned and the correct lifting truck and attachments are selected
	3.2 The load is lifted, carried, lowered and set down in accordance with OH&S legislation, manufacturers specifications and company procedures

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ELEMENT	PERFORMANCE CRITERIA
4 Monitor site conditions	4.1 When selecting the most efficient route, hazards and traffic flow are identified and appropriate adjustments are made
	4.2 Site conditions are assessed to enable safe operations and to ensure no injury to people or damage to property, equipment, loads or facilities occurs
5 Monitor and maintain forklift performance	5.1 Performance and efficiency of vehicle operation is monitored during use
	5.2 Defective/irregular performance and malfunctions reported to relevant personnel
	5.3 Forklift records are maintained/updated in accordance with workplace procedures and legislative requirements

Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

Required knowledge:

- Relevant duty of care requirements pertaining to the operation of a forklift
- Relevant OH&S and environmental procedures and regulations
- Workplace operating procedures
- Forklift controls, instruments and indicators and their use
- Forklift handling procedures
- Procedures to be followed in the event of an operational emergency
- Engine power management and safe operating strategies
- Efficient driving techniques
- Operating hazards and related defensive driving and hazard control techniques
- Pre-operational checks carried out on forklift and related action
- Principles of stress management when driving a forklift
- Site layout and obstacles

Required skills:

- Communicate effectively with others when operating a forklift
- Read and interpret instructions, procedures, information and signs relevant to the operation of a forklift

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Required skills:

- Interpret and follow operational instructions and prioritise work
- Complete documentation related to the operation of a forklift
- Operate electronic communication equipment to required protocol
- Work collaboratively with others when operating a forklift
- Adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions with others
- Promptly report and/or rectify any identified problems, faults or malfunctions in accordance with regulatory requirements and workplace procedures
- Implement contingency plans for unexpected events when operating a forklift
- Apply precautions and required action to minimise, control or eliminate hazards that may exist during the operation of a forklift
- Monitor work activities in terms of planned schedule
- Modify activities depending on differing operational contingencies, risk situations and environments
- Apply fatigue management knowledge and techniques
- Work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- Operate and adapt to differences in equipment in accordance with standard operating procedures
- Select and use required personal protective equipment conforming to industry and OH&S standards
- Identify points of balance and safe lifting positions on a range of loads when operating a forklift (including accessories)
- Monitor performance of forklift and its equipment and take appropriate action where required
- Ensure that a forklift and its equipment are maintained in terms of service schedule and standard operating procedures
- Check and replenish fluids and carry out lubrication processes in the course of work activities

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

Critical aspects for assessment and evidence required to	• The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the

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EVIDENCE GUIDE

demonstrate competency in this unit	requirements of the elements and performance criteria of this unit and include demonstration of applying: • the underpinning knowledge and skills • relevant legislation and workplace procedures • other relevant aspects of the range statement

Context of and specific resources for assessment	• Performance is demonstrated consistently over a period of time and in a suitable range of contexts
	• Resources for assessment include:
	  • a range of relevant exercises, case studies and/or other simulated practical and knowledge assessment, and/or
	  • access to an appropriate range of relevant operational situations in the workplace
	• In both real and simulated environments, access is required to:
	  • relevant and appropriate materials and equipment, and
	  • applicable documentation including workplace procedures, regulations, codes of practice and operation manuals

Method of assessment	• Assessment of this unit must be undertaken by a registered training organisation
	• As a minimum, assessment of knowledge must be conducted through appropriate written/oral tests
	• Practical assessment must occur:
	  • through activities in an appropriately simulated environment at the registered training organisation, and/or
	  • in an appropriate range of situations in the workplace

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Types of forklift may include:	• counterbalance trucks • reach trucks • pallet trucks

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RANGE STATEMENT

Operations may be carried out in typical forklift operational situations, including:	• operations conducted at day or night • typical weather conditions • on the open road • on a private road or worksite • while at a workplace
Customers may be:	• internal or external
Workplaces may comprise:	• large, medium or small worksites
Work may be conducted in:	• restricted spaces • exposed conditions • controlled or open environments
Loads to be shifted may require:	• special precautions
Loads to be shifted may be:	• irregularly shaped • packaged or unpackaged • labelled or unlabelled • palleted or unpalleted
Hazards in the work area may include exposure to:	• chemicals • dangerous or hazardous substances • movements of equipment, goods and materials
Personnel in the work area may include:	• workplace personnel • site visitors • contractors • official representatives
Forklift handling procedures may include:	• starting a forklift • steering and manoeuvring a forklift • accelerating and braking • positioning and stopping a forklift • reversing a forklift • operating forklift controls, instruments and indicators • using defensive driving techniques • managing engine performance
Pre-operational checks may include:	• visual check of forklift • checking and topping up of fluid levels • checks of tyres • checks of operation of forklift lights and indicators • checks of brakes
Hazards may include (examples only):	• wet and iced operating surfaces • oil on operating surface

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RANGE STATEMENT

	• faulty brakes • workplace obstacles and other operational equipment and vehicles • damaged loads and pallets • other personnel in work area
Depending on the type of organisation concerned and the local terminology used, workplace procedures may include:	• company procedures • enterprise procedures • organisational procedures • established procedures
Personal protection equipment may include:	• gloves • safety headwear and footwear • safety glasses • two-way radios • high visibility clothing
Information/documents may include:	• goods identification numbers and codes, including IMDG markings and HAZCHEM signs • manifests, bar codes, picking slips, merchandise transfers, stock requisitions, goods and container identification • Australian Standard 2359 - Industrial Truck Code • manufacturers specifications for forklift and associated equipment • operations and service record book or log • workplace procedures and policies for the operation of forklifts • supplier and/or client instructions • ADG Code and material safety data sheets • regulatory requirements concerning the use of forklifts • award, enterprise bargaining agreement, other industrial arrangements • standards and certification requirements • quality assurance procedures • emergency procedures
Applicable procedures and codes may include:	• relevant state/territory regulations pertaining to the operation of forklifts • relevant codes and standards, including Australian Standard 2359 - Industrial Truck Code • relevant state/territory OH&S legislation • relevant state/territory fatigue management regulations • relevant state/territory environmental protection legislation

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Unit Sector(s)

Not Applicable

Competency Field

Competency Field D - Load Handling

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TLIL4059A Implement asset management systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

This unit involves the skills and knowledge required to implement asset management systems. It includes determining management control processes; implementing existing practices, procedures and systems; and reviewing service levels. Licensing, legislative, regulatory or certification requirements are applicable to this unit.

Application of the Unit

Application of the Unit

Work may be undertaken in various contexts within the transport and logistics industry.

The unit generally applies to those who provide leadership of others individually or in teams and have responsibility for the implementation and monitoring of asset management systems.

This unit is normally packaged at AQF IV or above.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Determine management control process	1.1 Roles and responsibilities of business units or departments are clarified to ensure effective management of assets in line with organisation policy and procedures 1.2 Specific reporting and monitoring standards required by enterprise requirements are understood and complied with 1.3 Information systems that provide the information necessary for effective and efficient asset management for all levels within the organisation are maintained 1.4 Regular audits are arranged, where appropriate to the organisation, to establish a continuous improvement cycle
2 Implement existing practices, procedures and systems	2.1 Assessments of current status of asset management activities within business units or departments are conducted regularly in accordance with asset management plan 2.2 Milestones and targets are adhered to by the groups responsible 2.3 Areas of difficulty are identified and strategies are followed to overcome these difficulties
3 Review service levels	3.1 Current levels of service provided by asset stock are critically examined 3.2 Areas of possible improvement in the effectiveness and efficiencies of owning and operating assets are identified in consultation with relevant personnel 3.3 Appropriate benchmarking is undertaken to enable continuous improvement in asset management strategies and practices

Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

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REQUIRED KNOWLEDGE AND SKILLS

Required knowledge:

- Relevant sections of national and state or territory regulatory requirements and codes of practice
- Code of practice for working collaboratively with others particularly with those involved in inputting data into asset management systems
- Requirements for completing relevant documentation including asset management reports
- Benchmarking practices
- Quality management principles and procedures
- Organisational and industry functions
- Detail of different approaches to asset management, including theoretical knowledge
- Characteristics of different types of information systems used to provide and assist in asset management
- Procedures for operating electronic communications equipment
- Procedures for identifying equipment defects and assessing for appropriate action

Required skills:

- Communicate effectively with others when implementing asset management systems
- Consult and liaise as required when working with a team of staff
- Manage team and encourage team participation
- Use critical analysis in order to determine the best approach to asset management for the enterprise
- Use lateral thinking in order to solve problems as they arise, or to generate ideas
- Interpret and follow operational instructions and prioritise work
- Complete documentation related to work activities and convey reports to senior management
- Operate electronic communication equipment to required protocol
- Adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions with others

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

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EVIDENCE GUIDE

Critical aspects for assessment and evidence required to demonstrate competency in this unit	• The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria of this unit and include demonstration of applying:
	  • the underpinning knowledge and skills
	  • relevant legislation and workplace procedures
	  • other relevant aspects of the range statement

Context of and specific resources for assessment	• Performance is demonstrated consistently over a period of time and in a suitable range of contexts
	• Resources for assessment include:
	  • a range of relevant exercises, case studies and/or other simulated practical and knowledge assessment, and/or
	  • access to an appropriate range of relevant operational situations in the workplace
	• In both real and simulated environments, access is required to:
	  • relevant and appropriate materials and equipment, and
	  • applicable documentation including workplace procedures, regulations, codes of practice and operation manuals

Method of assessment	• Assessment of this unit must be undertaken by a registered training organisation
	• As a minimum, assessment of knowledge must be conducted through appropriate written/oral tests
	• Practical assessment must occur:
	  • through activities in an appropriately simulated environment at the registered training organisation, and/or
	  • in an appropriate range of situations in the workplace

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Asset management activities may	• introduction of information systems

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RANGE STATEMENT

include:	• data capture program • studies
Areas of possible improvement may include:	• spot checks • number of assets • complexity of assets, including their sophistication and issues involved • age of the asset base • quality of the assets constructed • levels of service provided or demanded
Regular audits may include:	• internal • external
Assets may include:	• equipment • buildings • employees • enterprise relationships
Depending on the organisation concerned, workplace procedures may be called:	• standard operating procedures (SOPs) • company procedures • enterprise procedures • organisational procedures • established procedures
Communication in the work area may include:	• phone • electronic data interchange (EDI) • fax • email • internet • RF systems • oral, aural or signed communications
Consultative processes may involve:	• other employees and supervisors • relevant authorities and institutions • management and union representatives • industrial relations and OH&S specialists
Documentation and records may include:	• reports of assets held and their status • relevant OH&S and environmental protection regulations • quality assurance procedures • emergency procedures • technical instructions • relevant Australian Standards and certification requirements
Applicable legislation and	• relevant national, state/territory legislation, including OH&S and environmental protection requirements

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RANGE STATEMENT

regulations may include:	• workplace relations regulations

Unit Sector(s)

Not Applicable

Competency Field

Competency Field L - Resource Management

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TLIL5055A Manage a supply chain

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

This unit involves the skills and knowledge required to manage a supply chain, including the relationships between an organisation and its supply and demand partners along the chain. It covers implementing a demand-driven supply chain management strategy, managing the supply chain, and evaluating and improving supply chain effectiveness. This unit has been derived from BSBPUR504A Manage a supply chain. Licensing, legislative, regulatory or certification requirements are applicable to this unit.

Application of the Unit

Application of the Unit

Work may be undertaken in various contexts within the transport and distribution industry.

The unit generally applies to those who provide leadership of others individually or in teams.

This unit is normally packaged at AQF V or above.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Implement demand-driven supply chain management strategy	1.1 Responsibility for supply chain management within the organisation is assigned in accordance with supply chain management strategy 1.2 Technology and software for implementation of the supply chain management system is accessed and operationalised within the requirements of the strategy and budgetary allocation 1.3 Policies and procedures are designed to guide business relations and operations in accordance with the strategy 1.4 Supporting business processes are designed or re-designed to support implementation of the strategy 1.5 Support is provided to staff, customers and supply chain to assist in implementation of the supply chain management strategy
2 Manage supply chain	2.1 Communication and information exchange with strategic partners and suppliers is managed in accordance with the supply chain management strategy 2.2 Collaboration with supply chain organisations is facilitated to determine demand at each level of the supply chain in accordance with the supply chain management strategy 2.3 Sales and payments are managed in accordance with supply chain and risk management strategies, and legal and ethical requirements 2.4 Actions to build trust and foster a supply chain culture are implemented in accordance with the supply chain management strategy 2.5 Opportunities are identified to adjust policies and procedures to respond to the changing needs of customers, supply chain and the organisation
3 Evaluate and improve supply chain	3.1 Demand chain management and supply chain management are monitored in accordance with the supply chain management

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ELEMENT	PERFORMANCE CRITERIA
effectiveness	strategy 3.2 The effectiveness of the supply chain is reviewed with each level of the supply chain, including staff and customers and areas identified for improvement 3.3 Business data and reports are used to compare outcomes, budgets, timelines and forecasts to actual performance 3.4 Technology performance is reviewed and recommendations are made for improvements to hardware, software and/or their use in accordance with strategy and budget 3.5 Feedback and evaluation results are used to plan and improve future supply chain management strategies

Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

Required knowledge:

- Legislation, codes of practice and national and international standards, for example Trade Practices Act, Sale of Goods Act and contract law
- Specific OH&S issues relevant to goods and services purchased
- Legislation related to importation of commodities, if relevant
- Organisation policies and procedures related to supply chain management, purchasing, and contracting and tendering
- Business terms and conditions for purchasing, tendering and contracting
- Ethical behaviour
- Product knowledge related to goods and services required by the organisation
- Ways to build trust and collaboration as opposed to competition
- Procedures for operating electronic communications equipment
- Requirements for completing relevant documentation

Required skills:

- Negotiate and liaise with suppliers and relevant stakeholders using verbal skills
- Use policy development and implementation support skills
- Use appropriate technology, including software
- Work with attention to detail and thoroughness

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Required skills:

- Focus on the customer
- Work collaboratively with others
- Adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions with others
- Implement contingency plans for unplanned events such as problems arising during the implementation and management of the supply chain

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	• The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria of this unit and include demonstration of applying:
	  • the underpinning knowledge and skills
	  • relevant legislation and workplace procedures
	  • other relevant aspects of the range statement

Context of and specific resources for assessment	• Performance is demonstrated consistently over a period of time and in a suitable range of contexts
	• Resources for assessment include:
	  • a range of relevant exercises, case studies and/or other simulated practical and knowledge assessment, and/or
	  • access to an appropriate range of relevant operational situations in the workplace
	• In both real and simulated environments, access is required to:
	  • relevant and appropriate materials and equipment, and
	  • applicable documentation including workplace procedures, regulations, codes of practice and operation manuals

Method of assessment	• Assessment of this unit must be undertaken by a registered training organisation • As a minimum, assessment of knowledge must be

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EVIDENCE GUIDE

	conducted through appropriate written/oral tests
	• Practical assessment must occur:
	  • through activities in an appropriately simulated environment at the registered training organisation, and/or
	  • in an appropriate range of situations in the workplace

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Improvements in the supply chain may include:	• the role of 'middlemen' or other middle supply chain elements being reduced or made redundant as newer more efficient supply chain methodologies and technologies are implemented • new value being created between producers and consumers
Demand chain management is:	• a collaborative process that involves determining how much product needs to be produced at each level of the supply chain through to the end consumer
Support to staff and others may include:	• policies, procedures and guidelines • intranet site information • workshops, briefings and training programs • written documentation in the form of manuals, help books, protocols • provision of a help-desk or contact persons • mentoring and coaching arrangements
Supporting business processes may include:	• data input • administration • ordering • delivering and receiving • accounting • payments
Supply chain management is:	• management of the entire cycle from raw materials to producers, component suppliers, manufacturers, wholesalers, third party service providers, retailers, customers and recyclers, plus freight, distribution and cash

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RANGE STATEMENT

	flow
Depending on the organisation concerned, workplace procedures may be called:	• standard operating procedures (SOPs) • company procedures • enterprise procedures • organisational procedures • established procedures
Documentation and records may include:	• relevant OH&S and environmental protection regulations • quality assurance procedures • documentation of policies and procedures associated with managing the supply chain strategy within the organisation • dangerous goods declarations and material safety data sheets, where applicable • goods manifest • relevant Australian Standards and certification requirements
Applicable legislation and regulations may include:	• relevant industry codes of practice • relevant Australian and state/territory regulations and codes of practice • workplace relations regulations • Sale of Goods Act, Trade Practices Act • relevant legislation related to the importation of commodities, if relevant

Unit Sector(s)

Not Applicable

Competency Field

Competency Field L - Resource Management

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TLIP4013A Implement and monitor logistics planning and process

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

This unit involves the skills and knowledge required to implement and monitor logistics planning and process. It includes planning an efficient logistics operation; developing a contingency management strategy; producing operational schedules; and monitoring and coordinating systems for logistics operations. Licensing, legislative, regulatory or certification requirements are applicable to this unit.

Application of the Unit

Application of the Unit

Work may be undertaken in various contexts within the transport and distribution industry.

The unit generally applies to those who provide leadership of others individually or in teams.

This unit is normally packaged at AQF IV or above.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan efficient logistics operation	1.1 Relevant Australian and international codes and regulations and workplace policies for logistics operation are identified
	1.2 Specifications and/or requirements for task outcomes are obtained, interpreted and, where necessary, clarified and applied to the development of a work plan
	1.3 Preliminary schedules are matched against operational capacity and capability of available transport systems, equipment and staff
	1.4 Strategies to address identified deficiencies in operational capability and availability are undertaken in accordance with workplace procedures
2 Develop contingency management strategy	2.1 Sequence of required activities is identified in accordance with company requirements
	2.2 Typical problems that may arise with logistics operations are identified and strategies for dealing with them determined
	2.3 Contingency management strategies for identified issues/incidents are established and evaluated including reference to previous scenarios of similar nature
3 Produce operation schedules for logistics	3.1 Resources are arranged in association with relevant Australian and overseas personnel to meet the operational schedules, policy and procedures
	3.2 Australian and international regulatory requirements, codes of practice and workplace procedures are identified and accounted for in operational schedule
	3.3 Records are stored in accordance with workplace procedures
4 Monitor and coordinate systems for logistics operations	4.1 Outcomes are checked and compared with planned objectives, task instructions and specifications to ensure all requirements are met
	4.2 Non-compliance with quality standards, planned processes or regulatory requirements is identified and appropriate action is initiated to report and rectify any identified problems

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ELEMENT	PERFORMANCE CRITERIA
	4.3 Customer concerns and suggestions for service improvements are acted upon in accordance with workplace procedures
	4.4 Any changes in Australian and international regulations and codes of practice relevant to export logistics are monitored, identified and appropriate action is initiated to ensure ongoing compliance of export logistics processes and systems

Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

Required knowledge:

- Relevant sections of national and state or territory regulatory requirements and codes of practice as they relate to the level and type of logistics operations undertaken by the enterprise
- Relevant OH&S and environmental procedures and regulations
- Australian and international regulatory, permit and licence requirements relevant to logistics
- Broad principles of supply chain management
- Business policies and plans including procedures for outsourcing components of operations and engaging additional resources
- Workplace policies including issue resolution and grievance procedures
- Coaching and mentoring approaches to support team members to share knowledge and skills

Required skills:

- Read and interpret local and international transport schedules, regulatory requirements, customer instructions, and workplace procedures and manuals
- Identify and solve problems that may arise during the planning and management of export logistics
- Provide leadership to others
- Plan and organise logistics operations
- Select and apply appropriate application of technology, information and communication systems and procedures
- Complete documentation related to work activities
- Work collaboratively with others
- Adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions with others

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Required skills:

- Develop and document contingency plans as part of the planning process
- Modify activities depending on differing operational contingencies, risk situations and environments

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	• The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria of this unit and include demonstration of applying:
	  • the underpinning knowledge and skills
	  • relevant legislation and workplace procedures
	  • other relevant aspects of the range statement

Context of and specific resources for assessment	• Performance is demonstrated consistently over a period of time and in a suitable range of contexts
	• Resources for assessment include:
	  • a range of relevant exercises, case studies and/or other simulated practical and knowledge assessment, and/or
	  • access to an appropriate range of relevant operational situations in the workplace
	• In both real and simulated environments, access is required to:
	  • relevant and appropriate materials and equipment, and
	  • applicable documentation including workplace procedures, regulations, codes of practice and operation manuals

Method of assessment	• Assessment of this unit must be undertaken by a registered training organisation • As a minimum, assessment of knowledge must be conducted through appropriate written/oral tests • Practical assessment must occur: • through activities in an appropriately simulated

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EVIDENCE GUIDE

	environment at the registered training organisation, and/or • in an appropriate range of situations in the workplace

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Consultative processes may involve:	• other employees and supervisors • relevant authorities and institutions • management and union representatives • industrial relations and OH&S specialists • customers and agents
Documentation and records may include:	• regulations and codes of practice relevant to ADG code, including safeworking and local authority regulations and procedures • relevant OH&S and environmental protection regulations • workplace policies and procedures related to ADG code • quality assurance procedures • dangerous goods declarations and material safety data sheets, where applicable • goods manifest • relevant Australian Standards and certification requirements
Applicable legislation and regulations may include:	• Australian Marine Orders and the International Maritime Dangerous Goods Code • Dangerous Goods by Air regulations • Australian and International Explosives Codes • transport licence/permit requirements • export/import/quarantine/bond requirements • Marine/Aviation Orders • equal opportunity, equal employment opportunity and affirmative action • Australian and international regulations and codes of practice for the transport of dangerous goods and hazardous substances • relevant state/territory OH&S and environmental

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RANGE STATEMENT

protection legislation
- workplace relations regulations

Unit Sector(s)

Not Applicable

Competency Field

Competency Field P - Administration and Finance

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TLIR4003A Negotiate a contract

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

This unit involves the skills and knowledge required to contract transport and distribution services in accordance with relevant regulatory requirements and workplace procedures. This includes negotiating the contract with a contractor, finalising the contract negotiations, and completing all enterprise contract requirements. Licensing, legislative, regulatory or certification requirements are applicable to this unit.

Application of the Unit

Application of the Unit

Work must be must be carried out in compliance with the relevant regulations, standards, legal requirements and codes of practice.

Work is under general guidance on progress and outcomes of work. It requires discretion and judgement for self and others in planning and using resources, services and processes to achieve required outcomes within workplace policy and procedures.

A range of opportunities may be used to develop the work area and to support the development of work systems, innovative strategies to deal with contingencies and to encourage the achievement of the workplace's goals and key performance objectives by the work area and the individuals and teams within it.

The unit generally applies to those with responsibility for resource coordination and allocation and who provide leadership of others individually or in teams.

Licensing/Regulatory Information

Refer to Unit Descriptor

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Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Negotiate contract with contractor	1.1 Requirements of the contract are clearly documented and understood by the relevant parties
	1.2 Areas of ambiguity or concern are clarified and resolved
	1.3 Negotiations are undertaken with selected contractor for the contracting of required goods/services on a 'without prejudice' basis
	1.4 Conditions for service and/or supply of goods/services are agreed between the enterprise and the contractor including the determination of key performance indicators
	1.5 Alternative contractors are negotiated with if agreement is unable to be reached with preferred contractor
	1.6 Contract negotiations conform to established workplace requirements and relevant legislation
2 Complete contract negotiations	2.1 Contract documentation is drafted in accordance with relevant legislation, workplace procedures and negotiated conditions of service and supply
	2.2 Technical support in the drafting of contracts is accessed where required
	2.3 Contract documentation is signed and exchanged between the relevant parties
3 Complete enterprise	3.1 Documentation systems are established to ensure traceability of

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ELEMENT	PERFORMANCE CRITERIA
contract requirements	orders and financial transactions 3.2 Workplace systems that require interaction with contractors are identified and actioned 3.3 Quality assurance procedures for supplied goods/services are initiated 3.4 Contract and ancillary documentation is completed and stored in accordance with workplace procedures and, where applicable, regulatory requirements

Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

Required knowledge:

- Regulations, codes of practice and legal requirements relevant to contractual arrangements
- Relevant OH&S and environmental protection procedures and regulations
- Workplace procedures for the negotiation of a contract
- Problems that may occur during the negotiation of a contract and action that can be taken to report or resolve the problems
- Risks that may exist when negotiating a contract and ways of controlling the risks involved
- Focus of operation supply arrangements, resources, management and workplace operating systems
- Applicable aspects of contract law
- Processes for contract formulation and negotiation
- Workplace business policies and plans including procedures for maintenance of confidentiality
- Equipment applications, capacities, and configurations
- Resource availability including the competencies of individuals in the team/group
- Relevant contract documentation requirements

Required skills:

- Communicate effectively with others when negotiating a contract
- Read and interpret instructions, procedures, information and regulatory requirements relevant to the negotiation of a contract
- Prioritise work and coordinate self and others in relation to workplace activities

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Required skills:

- Complete documentation related to the negotiation of a contract
- Operate electronic communication equipment to required protocol
- Provide leadership and work collaboratively with others when negotiating a contract
- Adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions with others
- Promptly report and/or rectify any identified problems that may arise when negotiating a contract in accordance with regulatory requirements and workplace procedures
- Apply precautions and required action to minimise, control or eliminate risks that may exist when negotiating a contract
- Plan and organise work activities
- Monitor work activities in terms of planned schedule
- Modify activities to cater for variations in workplace contexts and environment
- Work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- Select and apply appropriate technology and information systems
- Adapt to differences in equipment in accordance with standard operating procedures

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	• The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria of this unit and include demonstration of applying:
	  • the underpinning knowledge and skills
	  • relevant legislation and workplace procedures
	  • other relevant aspects of the range statement

Context of and specific resources for assessment	• Performance is demonstrated consistently over a period of time and in a suitable range of contexts
	• Resources for assessment include:
	  • a range of relevant exercises, case studies and/or other simulated practical and knowledge assessment, and/or
	  • access to an appropriate range of relevant operational

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EVIDENCE GUIDE

	situations in the workplace
	• In both real and simulated environments, access is required to:
	  • relevant and appropriate materials and equipment, and
	  • applicable documentation including workplace procedures, regulations, codes of practice and operation manuals

Method of assessment	• Assessment of this unit must be undertaken by a registered training organisation
	• As a minimum, assessment of knowledge must be conducted through appropriate written/oral tests
	• Practical assessment must occur:
	  • through activities in an appropriately simulated environment at the registered training organisation, and/or
	  • in an appropriate range of situations in the workplace

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Work may be undertaken:	• in various work environments in warehousing, storage, transport and distribution industries
Customers may be:	• internal or external
Operations may be conducted:	• by day or night
The workplace environment may involve:	• twenty-four hour operation • single and multi-site location • large, medium and small workplaces
Services, products, risks, work systems and requirements:	• potentially vary in different sections of the enterprise
Contracts may be for:	• singular or continuous supply of goods and/or services
Document/data interchange may be:	• electronic • paper-based

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RANGE STATEMENT

Clients/customers/suppliers may include:	• domestic and international contractors • corporations • individuals • government agencies
Contract must conform to:	• relevant legislation in regard to issues of probity and fair dealings
Consultative processes may involve:	• employees, supervisors and managers • contractors • suppliers and current or potential clients • legal representatives, financial managers, accountants • relevant authorities, government departments and institutions • representatives of other enterprises and organisations related to the international transfer of freight • industrial relations and OH&S specialists • other professional, maintenance and technical staff
Communications systems may involve:	• fixed and mobile telephone • radio • fax • email • electronic data transfer of information • mail, forms and internal memos
Depending on the type of organisation concerned and the local terminology used, workplace procedures may include:	• company procedures • enterprise procedures • organisational procedures • established procedures
Documentation/records may include:	• codes of practice and regulations relevant to the transport and distribution contractual arrangements • legal and contract documentation • workplace operating procedures and policies • operations manuals, job specifications and procedures and induction documentation • supplier and/or client instructions • Australian and International standards, criteria and certification requirements • communications technology equipment and oral, aural or signed communications • quality assurance standards and procedures • emergency procedures • relevant competency standards and training materials

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RANGE STATEMENT

Applicable procedures and codes may include:	• QA plans, data and document control • conditions of service, legislation and industrial agreements including workplace agreements and awards • regulations and codes of practice relevant to contractual arrangements • Australian and international regulations and codes of practice for the handling and transfer of dangerous goods and hazardous substances • relevant financial regulations • Australian and international standards and certification requirements • relevant state/territory OH&S legislation • relevant state/territory environmental protection legislation • relevant licence or permit requirements and associated regulations • relevant workplace relations legislation • relevant workers compensation legislation • equal opportunity, equal employment opportunity and affirmative action legislation

Unit Sector(s)

Not Applicable

Competency Field

Competency Field R - Contract Procurement

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TLIR4008A Implement and supervise stocktaking procedures

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

This unit involves the skills and knowledge required to implement and monitor stocktaking procedures. It includes maintaining stock records; implementing stocktaking and stock rotation; and identifying stock losses. Licensing, legislative, regulatory or certification requirements are applicable to this unit.

Application of the Unit

Application of the Unit

Work may be undertaken in various contexts within the transport and logistics industry.

The unit generally applies to those who provide leadership of others individually or in teams.

This unit is normally packaged at AQF IV or above.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Maintain stock records	1.1 Stock levels and records are monitored and maintained at required levels 1.2 Stock reorder cycles are monitored, maintained and adjusted as required 1.3 Stock storage and movement records are maintained in line with organisation's policy
2 Implement stocktaking and stock rotation processes	2.1 Policies and procedures in regard to stocktaking and cyclical counts are interpreted and explained to team members 2.2 Stocktaking tasks are allocated to individual team members 2.3 Team members are provided with clear directions for the performance of each task and supervised 2.4 Stocktaking and stock rotation procedures are implemented
3 Identify stock losses	3.1 Losses are accurately identified, recorded and assessed against potential loss forecast on a regular basis 3.2 Avoidable losses are identified and reasons established 3.3 Possible solutions to avoidable losses are recommended and implemented 3.4 Accurate reports on stocktake data, including discrepancies are produced for management

Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

Required knowledge:

- Relevant sections of national and state or territory regulatory requirements and codes of practice
- Relevant OH&S and environmental procedures and regulations

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REQUIRED KNOWLEDGE AND SKILLS

- Safe handling of specific dangerous goods (as relevant for enterprise)
- Stock control
- Stock replenishment/reorder procedures
- Procedures fo identifying and recording discrepancies/damage
- Procedures for operating electronic communications equipment
- Requirements for completing relevant documentation

Required skills:

- Communicate effectively with others when supervising a team of people involved in stocktaking
- Read and interpret instructions, procedures, information and signs relevant to work activities
- Complete documentation related to work activities including stocktake documentation
- Work collaboratively with others
- Adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions with others
- Promptly report and/or rectify any identified problems, faults or malfunctions in accordance with regulatory requirements and workplace procedures
- Implement contingency plans for unplanned events
- Monitor work activities in terms of planned schedule
- Operate equipment in accordance with standard operating procedures

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

- The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria of this unit and include demonstration of applying:
  - the underpinning knowledge and skills
  - relevant legislation and workplace procedures
  - other relevant aspects of the range statement

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EVIDENCE GUIDE

Context of and specific resources for assessment	• Performance is demonstrated consistently over a period of time and in a suitable range of contexts
	• Resources for assessment include:
	  • a range of relevant exercises, case studies and/or other simulated practical and knowledge assessment, and/or
	  • access to an appropriate range of relevant operational situations in the workplace
	• In both real and simulated environments, access is required to:
	  • relevant and appropriate materials and equipment, and
	  • applicable documentation including workplace procedures, regulations, codes of practice and operation manuals

Method of assessment	• Assessment of this unit must be undertaken by a registered training organisation
	• As a minimum, assessment of knowledge must be conducted through appropriate written/oral tests
	• Practical assessment must occur:
	  • through activities in an appropriately simulated environment at the registered training organisation, and/or
	  • in an appropriate range of situations in the workplace

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Categories or groups of products or stock may include:	• small parts • perishable goods • goods for overseas export • dangerous goods • temperature controlled stock • fragile goods
Communication in the work area	• phone • electronic data interchange (EDI)

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RANGE STATEMENT

may include:	• fax • email • internet • RF systems • oral, aural or signed communications
Documentation and records may include:	• policy and procedures for receipt and despatch of goods • procedures for stocktake • manufacturers specifications and/or supplier handling and storage advice • material safety data sheets • industry codes of practice • legislation and statutory requirements • regulations and codes of practice relevant to ADG code, including safeworking and local authority regulations and procedures • relevant OH&S and environmental protection regulations • quality assurance procedures • dangerous goods declarations and material safety data sheets, where applicable
Applicable legislation and regulations may include:	• relevant regulations, codes and safeworking systems for the use and checking of stock • Australian and international regulations and codes of practice for the transport of dangerous goods and hazardous substances • relevant state/territory OH&S and environmental protection legislation • workplace relations regulations • safe disposal of out-of-date stocks

Unit Sector(s)

Not Applicable

Competency Field

Competency Field R - Contract Procurement

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TLIR4009A Implement purchasing systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor This unit involves the skills and knowledge required to implement purchasing systems. It includes identifying purchasing requirements; sourcing purchases; checking costings, and arranging purchasing. Licensing, legislative, regulatory or certification requirements are applicable to this unit.

Application of the Unit

Application of the Unit

Work may be undertaken in various contexts within the transport and distribution industry.

The unit generally applies to those who provide leadership of others individually or in teams.

This unit is normally packaged at AQF IV or above.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Identify purchasing requirements	1.1 Purchasing requirements are identified from orders and instructions in accordance with workplace procedures 1.2 Quantities, quality of goods, price limitations and delivery requirements are determined or confirmed in consultation with appropriate personnel
2 Source purchase	2.1 Source/s of materials are identified from workplace preferred supplier lists or through networks and knowledge of local and/or overseas suppliers 2.2 The supplier/vendor is advised of the requirements and specifications in accordance with site requirements 2.3 Availability of supply is confirmed 2.4 Difficulties in supply are reported in accordance with workplace procedures
3 Check costings	3.1 Alternative suppliers are contacted to check different costings 3.2 Actual costs are compared to predicted costs 3.3 Any recommendations regarding alternative suppliers are communicated to appropriate personnel following workplace procedures 3.4 All records/reports are maintained in accordance with site requirements
4 Purchase materials	4.1 Capacity of supplier to meet price, quality and delivery expectations is checked 4.2 Order is placed with supplier and delivery schedules are confirmed 4.3 Appropriate orders and invoices are exchanged according to workplace procedures 4.4 Materials are checked/inspected on receipt in accordance with site requirements

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Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

Required knowledge:

- Relevant sections of national and state or territory regulatory requirements and codes of practice, particularly those relating to trade practices and privacy of information
- Relevant OH&S and environmental procedures and regulations
- Enterprise purchase/sales records system
- Knowledge of different types of purchasing systems, their use and applications
- Procedures for operating electronic communications equipment
- Requirements for completing relevant documentation, particularly in relation to systems implementation
- Code of practice for working collaboratively with others
- Typical problems encountered in implementing purchasing systems and possible solutions
- Steps involved in planning the work activities

Required skills:

- Communicate effectively with others when completing work activities
- Read and interpret instructions, procedures, information and signs relevant to work activities
- Interpret and follow operational instructions and prioritise work
- Complete documentation related to purchasing systems, including reports, and documenting of discrepancies
- Operate electronic communication equipment to required protocol
- Work collaboratively with others
- Adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions with others
- Promptly report and/or rectify any identified problems, errors in data input, collection or measurement, particularly in relation to cost, order quantity or quality
- Modify activities depending on differing operational contingencies, risk situations and environments
- Monitor work activities in terms of planned schedule and ensure purchasing system is operating within identified time constraints

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Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

- The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria of this unit and include demonstration of applying:
  - the underpinning knowledge and skills
  - relevant legislation and workplace procedures
  - other relevant aspects of the range statement

Context of and specific resources for assessment

- Performance is demonstrated consistently over a period of time and in a suitable range of contexts
- Resources for assessment include:
  - a range of relevant exercises, case studies and/or other simulated practical and knowledge assessment, and/or
  - access to an appropriate range of relevant operational situations in the workplace
- In both real and simulated environments, access is required to:
  - relevant and appropriate materials and equipment, and
  - applicable documentation including workplace procedures, regulations, codes of practice and operation manuals

Method of assessment

- Assessment of this unit must be undertaken by a registered training organisation
- As a minimum, assessment of knowledge must be conducted through appropriate written/oral tests
- Practical assessment must occur:
  - through activities in an appropriately simulated environment at the registered training organisation, and/or
  - in an appropriate range of situations in the workplace

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Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Depending on the organisation concerned, workplace procedures may be called:	• standard operating procedures (SOPs) • company procedures • enterprise procedures • organisational procedures • established procedures
Communication in the work area may include:	• phone • electronic data interchange (EDI) • fax • email • internet • RF systems • oral, aural or signed communications
Consultative processes may involve:	• other employees and supervisors • suppliers of equipment • relevant authorities and institutions • management and union representatives • industrial relations and OH&S specialists
Documentation and records may include:	• workplace policies and procedures related to purchasing, record keeping and costing • purchasing records such as order forms, instructions or invoices • workplace preferred supplier lists • quality assurance procedures • relevant OH&S and environmental protection regulations • emergency procedures • dangerous goods declarations and material safety data sheets, where applicable • relevant Australian Standards and certification requirements
Applicable legislation and regulations may include:	• trade practices legislation • privacy legislation • workplace relations regulations

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Unit Sector(s)

Not Applicable

Competency Field

Competency Field R - Contract Procurement

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TLIR4010A Plan purchasing

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor This unit involves the skills and knowledge required to plan purchasing, including preparing invitations to offer, identifying suppliers, issuing invitations to offer, and preparing purchase recommendations. Licensing, legislative, regulatory or certification requirements are applicable to this unit.

Application of the Unit

Application of the Unit

Work may be undertaken in various contexts within the transport and distribution industry.

The unit generally applies to those who provide leadership of others individually or in teams.

This unit is normally packaged at AQF IV or above.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare invitations to offer	1.1 Specifications for goods and services to be purchased are obtained from relevant personnel and clarified as required 1.2 Purchasing methods most appropriate to particular purchases are selected 1.3 Invitations to offer are prepared 1.4 Approval of invitations to offer is obtained
2 Identify suppliers	2.1 Organisation's records are reviewed for potential suppliers 2.2 Sources of supply are identified 2.3 Invitations to suppliers are made 2.4 Sources of supply are evaluated against requirements of purchasing strategies
3 Issue invitations to offer	3.1 Invitations to offer are distributed 3.2 Briefings are conducted as required 3.3 Clarification of issues arising is made with suppliers in line with purchasing strategies
4 Prepare recommendations to purchase	4.1 Offer documents are received from suppliers 4.2 Offer documents are assessed against requirements of purchasing strategies 4.3 Further information is sought from suppliers as required 4.4 Specialist expertise is obtained to assist with evaluation as required 4.5 Offers are evaluated against requirements of purchasing strategies 4.6 Shortlists of suppliers that make offers and who meet purchasing criteria are prepared 4.7 Preferred offers are selected 4.8 Recommendations about preferred offers are made for approval by relevant personnel 4.9 Approval is obtained for recommended offers

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Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

Required knowledge:

- Relevant legislation, codes of practice and national standards related to procurement, for example Trade Practices Act, contract law, sale of goods legislation, consumer protection legislation and legislation related to the import of goods and services, where relevant
- Relevant OH&S and environmental procedures and regulations
- All details of the organisation's purchasing strategies
- Product knowledge about the goods and services being supplied
- Procedures for operating electronic communications equipment
- Requirements for completing relevant documentation
- Code of practice for working collaboratively with others
- Steps involved in planning the work activities

Required skills:

- Communicate effectively with others, including verbal skills to negotiate and liaise with potential suppliers and relevant personnel, and written skills including report writing
- Read and interpret instructions, procedures, information and signs relevant to the planning of purchasing
- Interpret and follow operational instructions and prioritise work
- Complete documentation related to work activities
- Operate electronic communication equipment to required protocol
- Work collaboratively with others
- Adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions with others
- Work systematically with required attention to detail
- Promptly report and/or rectify any identified problems in accordance with regulatory requirements and workplace procedures
- Implement contingency plans for unplanned events
- Apply precautions and required action to minimise, control or eliminate hazards that may exist
- Modify activities depending on differing operational contingencies, risk situations and environments
- Monitor work activities in terms of planned schedule
- Apply and use software appropriately

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Required skills:

- Behave ethically and with probity in all aspects or work activities and adhere to industry and organisational codes of conduct

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	• The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria of this unit and include demonstration of applying:
	  • the underpinning knowledge and skills
	  • relevant legislation and workplace procedures
	  • other relevant aspects of the range statement

Context of and specific resources for assessment	• Performance is demonstrated consistently over a period of time and in a suitable range of contexts
	• Resources for assessment include:
	  • a range of relevant exercises, case studies and/or other simulated practical and knowledge assessment, and/or
	  • access to an appropriate range of relevant operational situations in the workplace
	• In both real and simulated environments, access is required to:
	  • relevant and appropriate materials and equipment, and
	  • applicable documentation including workplace procedures, regulations, codes of practice and operation manuals

Method of assessment	• Assessment of this unit must be undertaken by a registered training organisation • As a minimum, assessment of knowledge must be conducted through appropriate written/oral tests • Practical assessment must occur: • through activities in an appropriately simulated environment at the registered training organisation,

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EVIDENCE GUIDE

and/or

- in an appropriate range of situations in the workplace

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Relevant personnel may include:	• internal users of purchased goods and services • owner and Board • CEO, managers, leaders, coordinators, supervisors and other persons authorised to commit the organisation to purchases • specialist personnel involved in purchasing, asset maintenance and finance
Purchasing methods may include:	• written quotations • invitation of open or select tenders • direct purchases using supply agreements • electronic trading • direct negotiations
Invitations to offer may include:	• specifications of goods and/or services required • criteria for selection of suppliers from offers received • draft contracts and agreements • delivery schedules • requirements for off-site storage and warehousing • required supplier capacity • quality requirements
Purchasing strategies include:	• the organisation's documented strategies for purchasing, covering policies, procedures, guidelines and documentation formats for purchasing from suppliers including entities owned by the organisation, partners, alliance members and local and distant suppliers • criteria for evaluating purchasing performance • methodology for evaluating purchasing performance • different policies, procedures and strategies for different dollar values of purchases • limits of authority to approve purchases • requirements for fairness and transparency in purchasing

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RANGE STATEMENT

	• organisational and industry codes of conduct and ethics
Clarification of issues may include:	• requests for further information about specifications not responded to, misinterpretations of specifications and supplementary/add on products or services
Further information may include:	• requests about specifications not responded to, misinterpretations of specifications and supplementary/add on products or services • supplier briefings and presentations
Consultative processes may involve:	• other employees and supervisors • relevant authorities and institutions • management and union representatives • industrial relations and OH&S specialists
Communication in the work area may include:	• phone • electronic data interchange (EDI) • fax • email • internet • RF systems • oral, aural or signed communications
Depending on the organisation concerned, workplace procedures may be called:	• standard operating procedures (SOPs) • company procedures • enterprise procedures • organisational procedures • established procedures
Documentation and records may include:	• organisation's policies, procedures, strategies, methods and instructions relevant to procurement • lists of relevant personnel to consult • proformas and instructions used when preparing invitations to offer • quality assurance procedures • technical instructions
Applicable legislation and regulations may include:	• relevant legislation, codes of practice and national standards related to procurement, for example Trade Practices Act, contract law, sale of goods legislation, consumer protection legislation and legislation related to the import of goods and services, where relevant • relevant industry codes of practice • Australian and international regulations and codes of practice for the transport of dangerous goods and hazardous substances • relevant state/territory OH&S and environmental

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RANGE STATEMENT

protection legislation
- award and enterprise agreements and relevant industrial instruments
- workplace relations regulations

Unit Sector(s)

Not Applicable

Competency Field

Competency Field R - Contract Procurement

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TLIR5005A Manage a contract

Modification History

Release 2. This is the second release of this unit in the TLI10 Transport and Logistics Training Package Version 4.0.

In Release 2 renumbering of the Elements and Performance Criteria were corrected.

Release 2 is equivalent to the previous release.

Unit Descriptor

This unit involves the skills and knowledge required to manage a contract. It includes confirming contract requirements; establishing a contract management system; and monitoring and evaluating the contract. Licensing, legislative, regulatory or certification requirements are applicable to this unit.

Application of the Unit

Work may be undertaken in various contexts within the transport and distribution industry.

The unit generally applies to those who provide leadership of others individually or in teams.

This unit is normally packaged at AQF V or above.

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Nil.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

1	Confirm contract requirements	1.1 Consult relevant parties to identify their requirements of the contract
		1.2 Identify special provisions needed
		1.3 Identify whether the contract is straightforward or whether specialist legal advice is needed and obtain advice where required
		1.4 Contract specifications clearly identify the outcomes and measures required in the key performance areas
		1.5 Relationship with contractor is managed in accordance with organisational policy and procedures
2	Establish contract management system	2.1 Effective communication/information strategies are established
		2.2 Dispute and complaint system is established according to organisational policy and procedures
		2.3 Consistent and accurate records of contract progress are maintained
		2.4 Management strategy is documented, monitored for effectiveness and adapted as necessary during the life of the contract
3	Monitor contract	3.1 Regular inspections of contract services are undertaken to ensure compliance with specifications
		3.2 Regular planned progress meetings are conducted and documented between all contract personnel to ensure problems are identified and resolved early and documented
		3.3 Variations between the specified scope of services and the contract are identified and documented and relevant personnel are notified without delay
		3.4 Contract costs are monitored on a regular basis to ensure that the service is carried out within financial and contractual requirements
		3.5 Payments for contract services are authorised in accordance with the conditions of contract and organisation's contract administrative system
4	Evaluate the contract	4.1 Evaluation of contract performance is undertaken relative to planned performance measures and in consultation with stakeholders and suppliers
		4.2 Conclusions are detailed against agreed criteria and a complete picture of performance of the supplier, the organisation's procurement processes and value for money is provided

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4.3 Evaluation is documented in accordance with organisational requirements to assist improvement in future procurement activities

4.4 Relevant parties are advised of evaluation outcomes in a timely manner in accordance with organisational guidelines

Required Skills and Knowledge

This section describes the knowledge and skills required for this unit.

Required knowledge:

- Relevant sections of national and state or territory regulatory requirements and codes of practice related to procurement, including law of contract, trade practices law and commercial law to a level sufficient to be able to manage the performance of a contractor
- Purchasing policies and practices of the organisation
- Whole-of-life considerations
- Disposals considerations
- Procedures for acceptance of goods or services
- Procurement approval processes
- Sufficient knowledge of finance to be able to manage a contract including negotiating price variations during the contract
- Performance management to be able to identify and manage compliance with the contract
- Confidentiality issues in relation to contracted services such as intellectual property
- Negotiation practice in procurement, including legal aspects
- Ethical issues
- Equal employment opportunity and anti-discrimination law
- Financial and accounting issues relevant to the contract.
- Procedures for operating electronic communications equipment
- Requirements for completing relevant documentation
- Code of practice for working collaboratively with others

Required skills:

- Communicate effectively with others when managing a contract
- Read and interpret instructions, procedures, information and the contract itself
- Interpret and follow operational instructions and prioritise work
- Complete documentation related to contract management, including reports relevant to deliverables of stages and completion

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- Operate electronic communication equipment to required protocol
- Work collaboratively with others
- Adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions with others
- Negotiate solutions to problems as they arise during the management timeframe of the contract
- Modify activities depending on differing operational contingencies, risk situations and environments and negotiate those modifications where necessary with the contractor or agent
- Monitor work activities in terms of planned schedule

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria of this unit and include demonstration of applying: • the underpinning knowledge and skills • relevant legislation and workplace procedures • other relevant aspects of the range statement
Context of and specific resources for assessment	Performance is demonstrated consistently over a period of time and in a suitable range of contexts Resources for assessment include: • a range of relevant exercises, case studies and/or other simulated practical and knowledge assessment, and/or • access to an appropriate range of relevant operational situations in the workplace In both real and simulated environments, access is required to: • relevant and appropriate materials and equipment, and • applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
Method of assessment	Assessment of this unit must be undertaken by a registered training organisation • As a minimum, assessment of knowledge must be conducted through appropriate written/oral tests Practical assessment must occur: • through activities in an appropriately simulated environment

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at the registered training organisation, and/or
- in an appropriate range of situations in the workplace

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Disputes and complaints may include disputes over:	• requirements • delivery schedules • price changes • extensions to scope • additional tasking • payment schedules
Depending on the organisation concerned, workplace procedures may be called:	• standard operating procedures (SOPs) • company procedures • enterprise procedures • organisational procedures • established procedures
Communication in the work area may include:	• phone • electronic data interchange (EDI) • fax • email • internet • RF systems • oral, aural or signed communications
Consultative processes may involve:	• other employees and supervisors • relevant authorities • legal or other expert advisers
Documentation and records may include:	• relevant legislation, regulations and codes of practice related to procurement and contracted services • relevant OH&S and environmental protection regulations, if applicable • organisation's policies and procedures on procurement and contracted services • contract schedules, specifications and related documentation • quality assurance procedures • relevant Australian Standards and certification requirements where these apply to the contracted services
Applicable legislation and	• relevant sections of national and state or territory

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regulations may include:	regulatory requirements and codes of practice related to procurement, including trade practices law, law of contract, commercial law and fair trading legislation

Unit Sector(s)

Not Applicable.

Competency Field

R - Contract Procurement

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TLIR5006A Develop, implement and review purchasing strategies

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

This unit involves the skills and knowledge required to develop, implement and review an organisation's purchasing strategies. It includes determining, developing and implementing purchasing strategies, evaluating these and implementing improvements. Licensing, legislative, regulatory or certification requirements are applicable to this unit.

Application of the Unit

Application of the Unit

Work may be undertaken in various contexts within the transport and distribution industry.

The unit generally applies to those who provide leadership of others individually or in teams.

This unit is normally packaged at AQF V or above.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Determine purchasing objectives	1.1 Industry benchmarks for purchasing are researched and analysed for suitability to organisation 1.2 Organisation's purchasing data and information are analysed 1.3 Consultations are undertaken with relevant stakeholders and personnel to inform development of purchasing objectives 1.4 Purchasing objectives in line with organisation's goals are drafted 1.5 Approval is gained from relevant personnel for purchasing objectives
2 Develop purchasing strategies	2.1 Purchasing strategies are developed, taking into account legal requirements and purchasing objectives 2.2 Purchasing criteria include the five rights 2.3 Human resource, financial and other plans are developed to implement purchasing strategies 2.4 Approval is gained for plans to implement purchasing strategies 2.5 Changes resulting from approval process are made to plans and strategies, as required
3 Implement purchasing strategies	3.1 Purchasing strategies are communicated to relevant personnel and stakeholders 3.2 Resources needed to implement purchasing strategies are accessed 3.3 Support is provided to implement purchasing strategies 3.4 Implementation of purchasing strategies by the organisation is monitored 3.5 Problems and issues arising during implementation are identified and addressed 3.6 Reports are provided to relevant personnel and stakeholders on implementation of purchasing strategies
4 Evaluate purchasing strategies and implement improvements	4.1 Implementation of purchasing strategies is reviewed 4.2 Improvements to purchasing strategies are identified from review process 4.3 Approval is gained to implement improvements to purchasing

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ELEMENT	PERFORMANCE CRITERIA
	strategies
	4.4 Improvements are communicated to relevant stakeholders and support is provided to implement improvements
	4.5 Implementation of improvements is monitored and reviewed to determine effectiveness of improvements

Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

Required knowledge:

- Legislation, codes of practice, national and international standards, for example Trade Practices Act, contract law, sale of goods legislation, and legislation related to the import of goods and services, if relevant
- Occupational health and safety (OH&S) issues relevant to goods and services purchased by the organisation
- Organisation policies and procedures related to purchasing; contracting and tendering; business terms and conditions for purchasing, tendering and contracting; and ethical behaviour
- Product knowledge related to goods and services required by the organisation
- Information about industry benchmarks for purchasing, including information from peak bodies and industry associations and Australian Standards

Required skills:

- Communicate effectively with others when developing, implementing and reviewing purchasing strategies, including consulting and negotiating with stakeholders, using writing skills to document policies and procedures, and supporting staff to implement strategies
- Read and interpret instructions, procedures and information relevant to work activities
- Prepare reports appropriate to the development, implementation and review of purchasing strategies
- Plan and prioritise work activities and research and analyse data
- Develop human resource, financial and other plans when developing, implementing and reviewing purchasing strategies
- Use monitoring, review and evaluation skills when developing, implementing and reviewing purchasing strategies
- Identify and address any problems relating to the development, implementation and review of purchasing strategies

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Required skills:

- Adapt appropriately to cultural differences in the workplace, including modes of behaviour and interaction with others

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	• The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria of this unit and include demonstration of applying:
	  • the underpinning knowledge and skills
	  • relevant legislation and workplace procedures
	  • other relevant aspects of the range statement

Context of and specific resources for assessment	• Performance is demonstrated consistently over a period of time and in a suitable range of contexts
	• Resources for assessment include:
	  • a range of relevant exercises, case studies and/or other simulated practical and knowledge assessment, and/or
	  • access to an appropriate range of relevant operational situations in the workplace
	• In both real and simulated environments, access is required to:
	  • relevant and appropriate materials and equipment, and
	  • applicable documentation including workplace procedures, regulations, codes of practice and operation manuals

Method of assessment	• Assessment of this unit must be undertaken by a registered training organisation • As a minimum, assessment of knowledge must be conducted through appropriate written/oral tests • Practical assessment must occur: • through activities in an appropriately simulated environment at the registered training organisation,

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EVIDENCE GUIDE

and/or

- in an appropriate range of situations in the workplace

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Relevant stakeholders may include:	• clients and customers • tenderers, suppliers and contractors
Relevant personnel may include:	• internal users of purchased goods and services • owner and Board • CEO, managers, leaders, coordinators, supervisors and other persons authorised to commit the organisation to purchases • specialist personnel involved in purchasing, asset maintenance and finance
Purchasing strategies include:	• policies, procedures, guidelines and documentation formats for purchasing from suppliers including entities owned by the organisation, partners, alliance members and local and distant suppliers • criteria for evaluating purchasing performance • methodology for evaluating purchasing performance • key performance indicators for purchasing • different policies, procedures and strategies for different dollar values of purchases • limits of authority to approve purchases • requirements for fairness and transparency in purchasing • organisational and industry codes of conduct and ethics
Legal requirements may include issues in relation to:	• access and equity • codes of practice • data collection, storage and retrieval • ethical conduct and governance • industrial relations • insurance • accreditation, licence, patent and copyright • operation, maintenance and service of tools, equipment,

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RANGE STATEMENT

	plant and machinery • occupational health and safety • planning • privacy and confidentiality • professional development • standards (Australian and international) • warranties

The five rights are:	• right supplier
	  • due diligence requirements
	  • demonstrable expertise and experience
	  • evidence of past legal compliance
	  • ethical conduct requirements
	  • requirements to use organisations linked by ownership, partnership, alliance or other arrangements
	• right price
	  • value-for-money
	  • cost/price analysis
	• right quantity:
	  • supply guarantees
	• right quality
	  • confidentiality and probity requirements
	  • measures to manage risk
	  • key performance indicators
	  • quality accreditation
	• right time
	  • supply guarantees

Resources include:	• human, physical and other resources such as:
	  • software systems
	  • staff to undertake or assist with purchasing
	  • documentation required for purchasing, such as proformas, order forms, standard tender documentation and basic standard contracts

Further information may include:	• training programs • written information including procedures and internet or intranet-based information • information sessions and briefings
Consultative processes may involve:	• other employees and supervisors • relevant authorities and institutions • management and union representatives

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RANGE STATEMENT

Communication in the work area may include:	• industrial relations and OH&S specialists • phone • electronic data interchange (EDI) • fax • email • internet • RF systems • oral, aural or signed communications
Depending on the organisation concerned, workplace procedures may be called:	• standard operating procedures (SOPs) • company procedures • enterprise procedures • organisational procedures • established procedures
Documentation and records may include:	• relevant workplace policies, procedures and codes of conduct relating to purchasing and business management • relevant OH&S and environmental protection regulations • quality assurance procedures • operations manuals, job specifications and induction documentation • relevant Australian Standards
Applicable legislation and regulations may include:	• relevant legislation from all levels of government that affects business operation • relevant industry codes of practice • Australian and international regulations and codes of practice for the transport of dangerous goods and hazardous substances • relevant state/territory OH&S and environmental protection legislation • workplace relations regulations • award and enterprise agreements and relevant industrial instruments

Unit Sector(s)

Not Applicable

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Competency Field

Competency Field R - Contract Procurement

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TLIX5015A Establish supply chains

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

This unit involves the skills and knowledge required to establish and develop a strategy and model for supply chain management. The establishment and development of supply chains in the materiel system are an integral support to the stated capability requirement. There are no specific licensing or certification requirements applicable to this unit.

Application of the Unit

Application of the Unit

This unit was developed for materiel logisticians working within materiel logistics but is applicable to any individual in broader logistic roles.

Typically these individuals must demonstrate the ability to work independently or as part of a team under direct and/or indirect supervision, use discretion and judgement, and take responsibility for the quality of their outputs. All activities are carried out in accordance with relevant organisational policy and procedures.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Determine the requirements of the supply chain	1.1 Components of the supply chain are identified and their links and inter-relationships are analysed in accordance with organisational policy and procedures
	1.2 Communication, data access, information sharing and technology requirements for an integrated supply chain are determined
	1.3 Requirements for collaborative planning, forecasting and tailored supply chains are identified
	1.4 Supply chain requirements are documented in accordance with organisational policy and procedures
2 Determine a strategy for supply chain management	2.1 Strategies for the supply chain are determined that cover outsourcing, choice of suppliers and partners, reshaping contractual relationships and the performance of the entire supply chain rather than individual supply chain segments
	2.2 Strategy includes matching supplier capability to customer requirements including strategies to optimise electronic information sharing and inventory risk management and minimise environmental impacts
	2.3 Strategies to build effective customer supplier relationships are identified
	2.4 Performance management strategies include customer satisfaction requirements across the supply chain continuum
	2.5 Supply chain management strategy includes strategic alliances, electronic business and electronic data interchange
	2.6 Strategy addresses legal, ethical, environmental and security issues relating to supply chain management
	2.7 Strategy includes the integration of supply chain processes into existing business processes
3 Develop a model for supply chain	3.1 Supply chain management options are researched, and strengths

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ELEMENT	PERFORMANCE CRITERIA
management	and weaknesses of each option are identified 3.2 Supply chain management models are investigated and their requirements are analysed and compared with the capability and culture of the supply chain 3.3 Model for supply chain management is developed that meets the needs of the organisation including information flow, collaborative planning and forecasting in accordance with the organisation's supply chain management strategy 3.4 Supply chain management model is developed to support reduced inventory footprints, operating costs, faster cycle times and greater customer satisfaction rates

Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

Required knowledge:

- Codification and cataloguing processes
- Industrial base capability
- Integrated logistics support
- International agreements
- Interoperability
- Legislative and regulatory environment, including environmental, sustainability issues as it pertains to supply chains
- Logistics governance
- Logistics support analysis principles and processes
- Materiel sustainment
- Performance measurement
- Planning processes
- Product knowledge related to systems and/or equipment in service in the organisation
- Organisational policy and procedures
- Organisational role relevant to supply chains
- Safety, legislative and statutory requirements, including environmental, sustainability issues relevant to supply chains
- Supply chain concepts

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Required skills:

- Analyse and evaluate information, and determine how it may be impacted by the supply chain or how the supply chain might be impacted by the information being considered
- Apply logistics and project management knowledge in establishing supply chains
- Consult and negotiate with stakeholders (both internal and external) and resolve any potential areas of conflict or concern to ensure that overall objectives are achieved
- Demonstrate an understanding of the strategic objectives of the organisation, and identify long-term factors and external considerations that need to be taken into consideration when establishing a supply chain
- Display resilience by continuing to move forward despite criticism or setbacks
- Identify relevant information from the integrated logistics support program and materiel sustainment program that is relevant to the establishment of supply chains
- Identify the relationship between organisational goals and recognise how own work contributes to the achievement of those goals
- Source information on best practice approaches adopted in both the public and private sectors, demonstrating an insight into how industry operates and the business drivers that influence industry with their dealings
- Undertake performance measurement to enable objectives to be measured against defined parameters

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

- Assessment must confirm the ability to:
  - adhere to relevant occupational health and safety requirements
  - analyse supply chain requirements
  - identify the requirements for plans and adjust them as necessary to ensure effective and efficient performance
  - initiate and efficiently monitor processes
  - initiate any remedial action required
  - communicate with stakeholders
  - prepare and provide relevant reports and

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EVIDENCE GUIDE

	documentation • Competency should be demonstrated over time and should be observed in a range of actual or simulated work contexts

Context of and specific resources for assessment	• Competency should be assessed in the workplace or in a simulated workplace environment
	• Access is required to:
	  • computer and relevant software
	  • legislation, guidelines, procedures and protocols relating to materiel logistics
	  • plans
	  • workplace documentation

Method of assessment	• Assessment of this unit must be undertaken by a registered training organisation
	• Where possible, assessment should be supported by questions to assess required knowledge. Questioning techniques should suit the language and literacy levels of the candidate
	• Assessment methods should reflect workplace demands such as literacy and the needs of particular groups
	• Assessment methods suitable for valid and reliable assessment of this unit of competency may include a combination of methods such as:
	  • authenticated evidence from the workplace and/or training programs
	  • case studies
	  • demonstration
	  • feedback from supervisors and peers regarding the candidate's ability
	  • observation
	  • portfolios
	  • projects
	  • questioning
	  • reviews or reports prepared by the candidate
	  • scenarios
	  • simulation or role plays

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Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

Supply chain may include:	• cash flow • entire cycle from raw materials to producers, component suppliers, manufacturers, wholesalers, third party service providers, retailers, customers and recyclers, freight, distribution • use of open and international supply chain management standards
Organisational policy and procedures may include:	• Australian Standards • international standards • logistics support analysis principles and processes • organisational instructions and standards
Data may include:	• electronic catalogues • electronic data interchange (EDI) • inventory data • logistics databases • product shipment data • real-time warehouse inventory status
Technology requirements may include:	• information technology to smooth the flow of data • radio frequency identification (RFID), barcoding and scanning technology • wireless application protocol (WAP) to allow personnel to access logistics databases via handheld or palm-sized devices

Unit Sector(s)

Not Applicable

Competency Field

Competency Field X - Logistics

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UEGNSG604B Fill gas cylinders

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This Competency Standard Unit covers the filling of gas cylinders for the distribution of LPG to customers. It includes persons; equipment; inspection and testing for correct date on cylinder; company's ownership; corrosion and impact damage; leaks; component and part damage; legislative and regulatory requirements for this standard as set out in AS 1596, AS 2030 and AS 3509 or its/their replacements.

Application of the Unit

Application of the Unit **2)**

This competency standard shall apply to work sites where the distribution of liquefied petroleum gas occurs.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit are not subject to licence regulation other than those directly related to Occupational Health and Safety, gas/electricity/water industry safety and compliance, industrial relations, environmental protection, telecommunications, anti discrimination and training. Commonwealth, State/Territory or Local Government legislation and regulations may exist that limits the age of operating certain equipment.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

Nil

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for filling of cylinders	1.1 Work instructions are received and confirmed
	1.2 Relevant requirements and established procedures to be followed for the work to be performed are discussed with all persons to establish and confirm the work schedule
	1.3 OHS, environmental and sustainable energy policies and procedures to be followed for the work to be performed are received and confirmed
	1.4 Suggestions to assist with the filling of gas cylinders are made to others involved in the work
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures
	1.6 Scope of responsibility under the relevant work permit are received and confirmed according to requirements and established procedures with relevant persons
	1.7 Resources including equipment, tools and personal protective equipment required for the job are obtained and in working order according to established procedures
	1.8 Relevant responsibilities associated with First Aid and other related work safety procedures at the worksite are confirmed in accordance with requirements and established procedures to ensure safety measures and followed in the instance of an incident.
	1.9 Client issues are referred to appropriate persons in accordance with industry and community standards

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ELEMENT	PERFORMANCE CRITERIA	
	1.10	Site is prepared according to given instructions and the work schedule for a quality outcome and to minimise risk and damage to property, commerce and individuals in accordance with established procedures
2 Fill cylinders	2.1	OHS policies and procedures and safe work practices are followed to eliminate or minimise incidents and hazards
	2.2	Lifting, climbing, working in confined spaces or aloft, and use of power tools, techniques and practices are safely followed in accordance with given instructions and according to requirements confirmed to eliminate the prospects of incidents
	2.3	Operational knowledge for the filling of gas cylinders is confirmed to ensure completion in an agreed timeframe and to quality standards with a minimum of waste according to requirements and established procedures
	2.4	The filling of gas cylinders is carried out in accordance with given instructions and established procedures
	2.5	Cylinders with defects such as leaks, damage etc are identified, marked and quarantined and identified hazards and OHS risks are reported to the immediate authorised persons for directions according to established procedures
	2.6	Non-routine events are referred to the immediate authorised persons for directions according to established procedures
	2.7	Problems associated with the filling of gas cylinders are dealt with using acquired known solutions and skills related to routine procedures to ensure work instructions and established procedures are met
	2.8	Ongoing checks of quality of the work are undertaken in accordance with given instructions and established procedures
3 Move and store	3.1	Cylinders are lifted and moved according to

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ELEMENT	PERFORMANCE CRITERIA	
cylinders safely		standard operating procedures against the work schedule and anomalies reported to authorised persons
	3.2	Accidents and incidents are actioned and reported to authorised persons in accordance with established procedures
	3.3	Work site is rehabilitated, cleaned up and made safe in accordance with given instructions and established procedures
	3.4	Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures
	3.5	Appropriate persons are notified of work completion according to established procedures
	3.6	Work completion records, report forms and data sheets are completed accurately in accordance with given instructions and established procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8)This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices for the filling of gas cylinders.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-G604 Fill cylinders B

G 2.1.1 Work in the gas sector

Evidence shall show an understanding of how work is

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conducted in the Gas Industry, specifically:

- The Gas Industry in Australia
- Australian gas resources
- Types of gas and uses
- Combustion.

G 2.1.2 Identify roles of statutory authorities

Evidence shall show an understanding of the roles of statutory authorities (government agencies, both State and Federal) that operate in the Gas Industry, including identifying:

- Statutory bodies
- Roles of statutory bodies
- Employer and employee responsibilities to statutory bodies.

G 2.1.3 Identify employment roles and responsibilities

Evidence shall show an understanding of the roles of major groups in the Gas Industry, that is employers and employees, including:

- The role of the employer
- Industry associations
- Employer obligations to safety
- Identification of disadvantaged and minority groups in Australian society
- Employers obligations to persons from disadvantaged and minority groups
- Employers obligations to occupational health and safety
- The role of commonwealth and state training regulatory authorities and industry skills councils and state training advisory bodies
- Roles and responsibilities of gas industry employees
- The employment contract
- Working to safety requirements
- Work according to lawful commands
- Belonging to employee organisations
- How to work with people from disadvantaged and minority groups
- Understanding the employees obligations to occupational health and safety
- Sources of support.

G 2.1.4 Apply relevant OHS regulations, policies and procedures

Evidence shall show an understanding of the basic workplace

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health and safety legislation and how this applies to individuals in a Gas Industry workplace, indicated by the following:

- Employer's responsibilities to relevant OHS legislation
- Employee's responsibilities to OHS legislation and organisation's policies and procedures
- OHS policies and procedures at the worksite.
- Australian Standards, guidelines and codes of practice

G 2.1.5 Work safely in the gas industry by reducing risk and using correct PPE

Evidence shall show an understanding of how to work safely in the gas industry indicated by the ability to:

- Correctly interpret and comply with Safety Signs including workplace Hazards, Warnings and PPE requirements
- Correctly interpret gas markers
- Identify the correct PPE required for work in the Gas Industry
- Locate and comply with procedures for correctly checking, maintaining and storing PPE
- Apply the process of Hazard identification, Risk assessment and Control
- Complete Risk Assessment forms such as Work Permits and JHA’s, JSA’s, JSEA’s, SWM’s etc
- Report workplace hazards

G 2.1.6 Work safely with hazardous materials and equipment

Evidence shall show an understanding of what constitutes hazardous materials and the equipment and processes used to safely work with these indicated by the following:

- Identify hazardous materials and equipment
- Location and purpose of Material Safety Data Sheets (MSDS)
- Read, interpret and discuss MSDS
- Knowledge of methods for safe disposal of hazardous waste materials
- Read, interpret and discuss relevant manufacturer's specifications
- Use and dispose of hazardous materials and equipment safely
- Use of spill kits and PPE

G 2.1.7 Apply safe manual handling techniques in the workplace

Evidence shall show an understanding of manual handling

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and how to apply this knowledge to handling heavy and awkward objects in a Gas Industry workplace, specifically:

- Principles for managing manual handling
- Characteristics and types of safe manual handling
- Safe manual handling techniques
- Manual handling and risk management

G 2.1.8 Control traffic at the work site

Evidence shall show knowledge and skills in coordinating traffic flow at a workplace where traffic control is required, that is, where work is conducted on or near a road, indicated by the following:

- Read and interpret relevant traffic authority regulations for traffic control at a worksite
- Identify signs and devices required to control pedestrians and traffic at a worksite depending on traffic flow volumes
- Apply techniques for controlling pedestrians and traffic at various worksites
- Use procedures for monitoring traffic controls
- Set up and monitor pedestrian and traffic controls

G 2.1.9 Respond to emergency and accident situations

Evidence shall show knowledge and skills in dealing with emergency or accident situations at a Gas Industry workplace, indicated by the following:

- Situations of accidents and emergency
- Comply with procedures for accidents and incidents
- Correct use of emergency equipment and procedures for a fire
- Correct use of breathing apparatus
- Correct use of gas detectors/oxygen monitoring devices
- Correct use of emergency equipment and procedures for a gas leak or vapour emission
- Report emergencies and accidents

G 2.1.14 Read and interpret Gas Industry documents

Evidence shall show an ability to read and interpret Gas Industry documents indicated by the following:

- Understand and use signs, symbols terminology and legends as used in gas industry procedures and documents
- Identify, locate and implement gas industry standards, policies and procedures

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- Interpret and read basic drawings and diagrams

G 2.1.15 Complete workplace forms, and reports

Evidence shall show an ability to complete routine Gas Industry forms, memos and reports either written or electronic, indicated by the following:

- Identify, locate, interpret and use workplace forms, and reports
- Enter the required information accurately on gas industry forms and reports

G 2.1.16 Identify requirements of work activity

Evidence shall show ability to:

- Clarify expected outcomes of a work activity in a Gas Industry workplace
- Receive, clarify and respond to verbal work instructions for work activity
- Interpret and discuss an organisation's policies, quality requirements and specifications for work activity

G 2.1.17 Apply basic planning skills

Evidence shall show a demonstrated ability to apply basic planning skills in a Gas Industry workplace, indicated by the following:

- Develop checklists of tasks
- Prioritise tasks
- Identify resources required to complete tasks safely and efficiently
- Identify resource or scheduling conflicts and apply solutions
- Develop time lines to complete tasks

G 2.1.18 Conduct tasks to complete work activities

Evidence shall show ability to organise the activities to complete a job in a Gas Industry workplace, indicated by the following:

- Locate and organise equipment, tools and machinery required to complete tasks safely and efficiently
- Complete tasks according to planned sequences and within appropriate timeframes
- Understand quality assurance and work according to established and standard operating procedures

G 2.1.19 Review work activities

Evidence shall show an ability to review work activities

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undertaken in a Gas Industry workplace, indicated by the following:

- Check work activities against a work plan
- Seek feedback on the outcome of work activities with appropriate persons
- Report outcomes of work activities in writing or orally according to enterprise procedures

G 2.1.20 Customer relations

Evidence shall show an understanding of the requirements for providing good customer relations to Gas Industry stakeholders, indicated by the following:

- Notify stakeholders of activities
- Communicate with stakeholders within scope of responsibilities
- Refer stakeholders to appropriate parties
- Demonstrate understanding of ring fencing requirements (if applicable)
- Keep the customer informed on job progress
- Provide good customer relations

G 2.1.21 Undertake problem solving

Evidence shall show an understanding of the requirements to undertake basic problem solving in a Gas Industry workplace, indicated by the following:

- Demonstrate problem solving and diagnostics methodology
- Identify possible solutions
- Recommend probable solutions and
- Apply basic problem solving techniques

G 2.1.22 Operate in confined spaces

Evidence shall show an understanding of the requirements to recognise and operate in confined spaces in a Gas Industry workplace, indicated by the following:

- Knowledge of the requirements of Legislation, Regulations, Australian Standards and enterprise specific procedures for safe working in confined spaces
- Ability to recognise what a confined space is and the entry safety requirements
- Ability to understand and comply with manufacturers' guidelines for the safe use of PPE used in confined spaces
- Understand how and when to use gas detectors for

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confined spaces entry
- Understand how and when to use breathing apparatus and rescue and recovery equipment

Note: A confined spaces entry ticket would satisfy and exceed the requirements of this EKAS clause

G 2.1.25 Protect the environment

- Evidence shall show an understanding and ability to perform work in the gas industry in a manner that protects the environment indicated by the following:Understanding of the relevant Commonwealth/State/Territory environmental legislation, regulations and codes of practice
- Understanding of employee's and employer's responsibilities to relevant environmental legislation, regulations and codes
  - Understanding and compliance with enterprise procedures for flora control
  - erosion control
  - fauna control
  - the protection of indigenous and cultural heritage sites
- Understanding the role of regulatory bodies in monitoring environmental activities, risk and incident compliance
- Understanding community expectations for protecting the environment
- Correct use of environment protection procedures, records, inspections and incident reporting
- Identifying environmental hazards
- Assessing environmental risks
- Implementing environmental control measures
- Ability to respond to workplace environmental incidents

Note: Environmental damage can be caused by chemicals, oil, water contamination, carcinogenic agents, gases, dusts, waste contamination and noise

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G 2.1.26 Communicate in the workplace

Evidence shall show an understanding and ability to communicate effectively in a Gas Industry work team indicated by the following:

- Effective use oral and written communications methods to achieve work related outcomes and solutions.
- Effectively receive, interpret and respond to workplace information and instructions
- Effectively convey and report work related information to fellow workers and customers
- Interact with fellow workers in a socially and culturally appropriate manner

G 2.6.1 Occupational Health and Safety for working with LPG

Evidence shall show an understanding of the specific OHS and working procedures required to work with LPG gas, indicated by awareness of:

- OHS and environmental legislation
- Australian Dangerous Goods Code (ADG)
- inspection procedures
- properties of LPG
- operational capacity of safety equipment on tankers
- standard operating procedures for dealing with LPG
- position and manoeuvrability of tankers
- appropriate ability to read meters
- and understanding of manufacturer's specifications
- out of gas procedures.

G 2.6.3 Operate equipment within its limitations

Evidence shall show an understanding of the specific knowledge required to operate equipment within its limitation in the LPG environment, indicated by the following:

- identify and understand the equipment used in the transporting of LPG
- use equipment for storing and transporting LPG.

G 2.6.6 Gas storage processes

Evidence shall show an understanding of the requirements to undertake tasks in the storage of LPG, indicated by the following:

- inspection procedures for cylinders and valves
- filling and storing of gas cylinders and valves.

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Evidence Guide

EVIDENCE GUIDE

9) The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment

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instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines — UEG11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and range
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures
- Demonstrate performance across a representative range of contexts from the prescribed items below.

Range of tools/equipment/procedures/workplace

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Group No	The minimum number of items on which skill is to be demonstrated	Item List
A	At least 5	Cylinder trolleys Hose and fittings Leak detection devices Valves Gauges Spindles
B	All	Inspection tests to determine: Date on cylinder is within the required period Company's ownership Corrosion and impact damage Correct storage Valve threads are clean and in good condition Safety relief valve is capped and free from obstruction
C	All	Requirements from: State regulations/statutes Aust Dangerous Goods Code AS1596 or replacement AS2030 or replacement AS3509 or replacement AS 2865 Emergency procedures and response action
D	All	Work utilising relevant OHS legislation, regulations, codes of practice, policies and

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		procedures Maintain a safe and clean workplace Work safely with hazardous materials and equipment Job safety analysis Apply safe manual handling techniques Respond to emergency situations Communicate effectively in the workplace Apply basic planning and job completion skills Operate equipment within its limitations Basic industry technology
E	At least one occasion	Deal with an unplanned event by drawing on essential knowledge and associated skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this Competency Standard Unit.

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- Appropriate environmental regulation and work practices.
- Appropriate organisational requirements.
- Appropriate work environment, equipment and tools.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency in filling gas cylinders.

Assessment of this competency must also be undertaken in either an actual workplace or under a simulated work environment. Assessment must also integrate the employability skills.

Method of assessment **9.4)**

This Competency Standard Unit shall be assessed by methods given in Volume 1, Part 3 ‘Assessment Guidelines’.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this Competency Standard Unit applies. This requires that the specified Essential Knowledge and Associated Skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and associated skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied Competency Standard Units where listed.

UEGNSG102B	Carry out work activities in a utilities industry work environment
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace

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UEGNSG104B	Comply with environmental policies and procedures
UEGNSG105B	Establish the work site

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

This Competency Standard Unit shall be demonstrated in relation to filling gas cylinders.

The following constants and variables included in the element/Performance Criteria in this unit are fully described in the Definitions Section of this volume and form an integral part of the Range Statement of this unit:

Appropriate Persons

Equipment (2)

Inspection Checks

Legislative Requirements (2)

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

LPG.

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UEPMNT420A Perform Electrical/Electronic Drafting

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1)**

This unit deals with the skills and knowledge required to perform drafting of electrical circuits and use of drawing equipment as applied to the production of schematic and wiring diagrams.

Application of the Unit

Application of the Unit **3)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

License to practise **3.1)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite Unit(s) **2)**

Competencies **2.1)**

There are no prerequisite units.

Employability Skills Information

Refer to the Evidence Guide

Elements and Performance Criteria Pre-Content

5) Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for drafting	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.

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ELEMENT	PERFORMANCE CRITERIA	
2 Perform electrical drafting	2.1	Schematics drawn to indicate relative positioning of electrical/electronic components
	2.2	Electrical drawings are produced in accordance with all relevant specification requirements
	2.3	Electrical/electronic components selected from manufacturer's/suppliers catalogues to meet specification requirements
	2.4	Drawings are produced in accordance with relevant standards
3 Complete the work	3.1	Drawings checked to ensure that assembly is possible in accordance with specification requirements
	3.2	Drawings produced, registered and recorded in accordance with instructions/site documentation procedures
	3.3	Relevant personnel notified and existing drawings/specification sheets updated as required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

6) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired performing electrical / electronic drafting.

The extent of the Essential Knowledge and Associated Skills required follows:

Evidence shall show that knowledge has been acquired for safe working practices of:

- Occupational Health and Safety standards
- Relevant statutory requirements
- standards and codes of practice
- Detailed drafting concepts

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REQUIRED SKILLS AND KNOWLEDGE

- Technical drawings and data
- Engineering practices (Electrical)
- Engineering drawing equipment
- Electrical/electronic drawing symbols
- Electrical/electronic circuits
- Communication principles
- Computer Aided Drawing systems

Specific skills needed to achieve the Performance Criteria:

- Apply Occupational Health and Safety standards
- Apply relevant statutory requirements and codes of practice
- Interpret and use technical drawings and data
- Perform electrical/electronic drafting
- Use drawing equipment
- Use Computer Aided Drawing systems
- Communicate effectively
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

8) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.**1**)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the

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EVIDENCE GUIDE

competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines - UEP06". Evidence shall also comprise:

- A representative body of Performance Criteria demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
    - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
    - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and Range Statement

- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation for drafting
  - Electrical drafting
  - Use of engineering drawing equipment
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and

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in a variety of environments.

Method of assessment

8.4)

This unit shall be assessed by methods given in Volume 1, Part 3 Assessment Guidelines.

Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

8.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following example of application: Explain ideas and actions, make suggestions for alternative actions and deal with contingencies and non-routine situations.	2
How can information be collected, analysed and organised?	Refer to the following example of application:	2
	Information with regard to operations, faults and maintenance may be observed and monitored for analysis and organised into records and reports.	

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Key competencies	Example of Application	Performance Level
How are activities planned and organised?	Refer to the following example of application: Planning the required activity, to include co-ordination and use of equipment, materials and tools to avoid backtracking and rework.	2
How is team work used within this competency?	Refer to the following example of application: Co-ordinate activities of the team and provide appropriate support to other team members in completion of work tasks to meet the team's goals.	2
How are mathematical ideas and techniques used?	Refer to the following example of application: Calculation of time to complete routine projects, operations, tasks, estimation of distances, levels, loads and material requirements.	2
How are problem solving skills applied?	Refer to the following example of application: Determine solutions which focus on long and short-term resolution of work task problems.	2
How is use of technology applied?	Refer to the following example of application: Access, communicate, measure and provide information to monitor operations and performance of plant and equipment.	2

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and	Refer to the following example of application:

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	using skills within a real workplace	Completion of tasks within an acceptable timeframe and performance with some supervision.
2	Learning to learn in the workplace	Refer to the following example of application:
		Comprehension and application of theoretical knowledge to well-developed skills.
3	Reflecting on the outcome and process of work task	Refer to the following example of application: Focused on improvement in own and other team member's performance in the workplace.
4	Interacting and understanding of the context of the work task	Refer to the following example of application: Working understanding of the processes and systems which apply to the workplace.
5	Planning and organising the meaningful work task	Refer to the following example of application: Achieving work tasks in a timely manner and ensuring that the work team achieves its stated work goals.
6	Performing the work task in non-routine or contingent situations	Refer to the following example of application: Seek advice and apply solutions to problems relevant to the workplace environment.

UEPMNT421A **Conduct technical inspection of process plant and equipment**

Range Statement

RANGE STATEMENT

7) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

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RANGE STATEMENT

Relevant legislation, standards or codes of practice may apply.

Dimensions may be notated in metric or imperial units.

Circuit diagrams will use electrical drawing symbols to Australian or equivalent standards.

Types of circuits drafted may include wiring, schematic and logic.

Drawing equipment used may include Computer Aided Drafting (CAD), conventional drawing tools.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Volume 2, Part 1.

Unit Sector(s)

Not Applicable

Literacy and numeracy skills

Literacy and numeracy skills **2.2**)

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Competency Field

Competency Field **4**)

Maintenance.

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